Provisional Patent Application of

Thomas E. Bearden

METHOD, SYSTEM AND APPARATUS FOR CONDITIONING ELECTROMAGNETIC POTENTIALS, FIELDS, AND WAVES TO TREAT AND ALTER MATTER

Inventor: Name Thomas E. Bearden, Ph.D.

Address correspondence to: Name: Thomas E. Bearden, Ph.D.

References Cited:

1. Melba Phillips, "Classical Electrodynamics," Vol. IV: Principles of Electrodynamics and Relativity, in Encyclopedia of Physics, Edited by S. Flugge, Springer-Verlag, Berlin, 1962, p. 1-108. Overview of superpotential theory.

2. (a) E. T. Whittaker, "On the Partial Differential Equations of Mathematical Physics," Mathematische Annalen, Vol. 57, 1903, p. 333-355; (b) — "On an Expression of the Electromagnetic Field Due to Electrons by Means of Two Scalar Potential Functions," Proceedings of the London Mathematical Society, Series 2, Vol. 1, 1904, p. 367-372.

3. Christopher Bird, "The Case of Antoine Prioré and His Therapeutic Machine: A Scandal in the Politics of Science," Appendix I in T. E. Bearden, AIDS: Biological Warfare, Tesla Book Co., P.O. Box 121873, Chula Vista, California 91912, 1988.

4. Jean-Michel Graille, Dossier Prioré: Une Nouvelle Affaire Pasteur [The Prioré Dossier: A New Pasteur Affair?]. De Noel, Paris, 1984 [in French].

5. Antoine Prioré, "Guerison de la Trypanosomiase Experimentale Aigue et Chronique par L'action Combinée de Champs Magnètiques et D'Ondes Electromagnètiques Modules," thesis submitted in candidacy for the doctoral degree, 1973.

6. Antoine Prioré, "Procede et dispositif de production de rayonnements utilisables notamment pour le traitement de cellules vivantes." [Procedure and Assemblage for Production of Radiation Especially Serviceable for the Treatment of Living Cells.]

Republique Francais: Brevet d'Invention P.V. No. 899.414, French Patent 1,342,772, Oct. 7, 1963.

7. Antoine Prioré, "Method of producing radiations for penetrating living cells," U.S. Patent 3,280,816, Oct. 25, 1966.

8. Antoine Prioré, "Apparatus for producing radiations penetrating living cells." U.S. Patent 3,368,155. Feb. 6, 1968.

9. T. E. Bearden, "Vacuum Engines and Prioré's Methodology: The True Science of Energy-Medicine, Parts I and II," Explore, 6(1), 1995, p. 66-76; 6(2), 1995, p. 50-62.

10. T. E. Bearden, Energetics: Extensions to Physics and Advanced Technology for Medical and Military Applications, May 1, 1998, enclosure to CTEC Letter to Maj. Gen. Thomas H. Neary, Dir. Nuc. And Counterprolif., Ofc. DCS, Air and Space Opns., HQ USAF, May 4, 1998, Subj: "Saving the Lives of mass BW Casualties from Terrorist BW Strikes on U.S. Population Centers."

11. T. E. Bearden, CTEC Letter to Maj. General Walter Busbee, Assistant to Secretary of Defense, dated April 2, 1998, Subject: "Saving the Lives of Mass BW Casualties from Terrorist BW Strikes on U.S. Population Centers," with enclosures.

12. Eric Perisse, Effets des Ondes Electromagnétiques et des Champs Magnétiques sur le Cancer et la Trypanosomiase Expérimentale. [Effects of Electromagnetic Waves and Magnetic Fields on Cancer and Experimental Trypanosomiasis], doctoral thesis, University of Bordeaux II, No. 83, Mar. 16, 1984 [in French].

13. S. K. Lisitsyn, "New Approach to the Analysis of Electroencephalograms," in Problems of Bionics (Selected Articles), Defense Documentation Center Report AD 73005, date unknown, p. 16-25, available through the National Technical Information System (NTIS).

14. R. O. Becker, C. A. L. Bassett, and C. H. Bachman, "The bioelectric control system regulating bone growth," Proceedings of the International Symposium on Biodynamics of Bone, Henry Ford Hospital, Detroit, Michigan, Mar. 1963; published by Little, Brown, and Co., 1964.

15. Robert O. Becker, Joseph A. Spadaro, and Andrew A. Marino, "Clinical experience with low intensity direct current stimulation of bone growth," Clinical Orthopedics and Related Research, No. 124, May 1977, p. 75-83.

16. Robert O. Becker, "The significance of bioelectric potentials," Bioelectrochemistry and Bioenergetics, Vol. 1, 1974, p. 187-199.

17. R. O. Becker, "Stimulation of partial limb regeneration in rats," Nature, Vol. 235, Jan. 14, 1972, p. 109-111. See also Robert O. Becker, "Augmentation of regenerative healing in man, a possible alternative to prosthetic implantation," Clinical Orthopaedics and Related Research, No. 83, March-April 1972, p. 255-262.

18. Robert O. Becker and Joseph A. Spadaro, "Electrical stimulation of partial limb regeneration in mammals," Bulletin of the New York Academy of Medicine, Second Series, 48(4), May 1972, p. 627-641.

19. Robert O. Becker, "The direct current field: A primitive control and communication system related to growth processes," Proceedings of the. XVI International. Congress of Zoology, Washington, D.C., Vol. 3, 1963, p. 179-183.

20. Robert O. Becker and David G. Murray, "The electrical control system regulating fracture healing in amphibians," Clinical Orthopaedics and Related Research, Vol. TBD, No. 73, Nov.-Dec. 1970, p. 169-198.

21. Robert O. Becker, "The significance of bioelectric potentials," Bioelectrochemistry and Bioenergetics, Vol. 1, 1974, p. 187-199.

22. Robert O. Becker and David G. Murray, "A method for producing cellular dedifferentiation by means of very small electrical currents," Transactions, New York Academy of Sciences, 29(5), Mar. 1967, p. 606-615.

23. F. A. Popp *et al.*, "Biophoton emission: New evidence for coherence and DNA as a source," Cell. Biophys., Vol. 6, 1984, p. 33-52.

24. F. A. Popp *et al.*, "Physical aspects of biophotons," Experientia, Vol. 44, 1988, p. 576-585.

25. Fritz A. Popp, "On the coherence of ultraweak photoemission from living tissues," in Disequilibrium and Self-Organization, ed. by C. W. Kilmister, ed.; D. Reidel, Hingham, MA, 1986.

26. Fritz Albert Popp, "Photon Storage in Biological Systems," in Fritz Albert Popp *et al.*, eds., Electromagnetic Bio-Information: Proceedings of the Symposium, Marburg, Federal Republic of Germany, Sep. 5, 1977; Urban & Schwarzenberg, Baltimore, 1979, p. 123-149.

27. F. Mandl and G. Shaw, Quantum Field Theory, Wiley, 1984, Chapter 5. Mandl and Shaw strongly argue that neither the scalar (time-polarized) photon nor the longitudinal photon is individually observable, but the combination of the two is observable as the instantaneous scalar potential. Translating this into the wave model and wave language, neither a time-polarized EM wave nor a longitudinal EM wave is individually observable, but the paired combination of the two is observable as the ordinary scalar potential. Hence Mandl and Shaw strongly support Bearden's reinterpretation [28] of Whittaker's biwave decomposition of the scalar potential, as does particle physics' broken symmetry of opposite charges such as a dipole.

28. T. E. Bearden, "Giant Negentropy from the Common Dipole," Journal of New Energy, 5(1), Summer 2000, p. 11-23. Bearden reinterprets Whittaker's 1903 decomposition of the scalar potential, where a Whittaker phase conjugate pair of longitudinal EM waves

becomes a time-polarized EM wave interacting with the usually assumed unit point static charge, followed by emission of the longitudinal EM energy in 3-space. Thus Whittaker's decomposition is extended to wavepairs where each pair consists of a time-polarized EM wave coupled to a longitudinal EM wave, with coupling or "combining" accomplished by interaction (emission and absorption) with charge. This reinterpretation is strongly supported by Mandl and Shaw [27] in quantum field theory.

29. David J. Bohm, "A Suggested Interpretation of the Quantum Theory in Terms of 'Hidden' Variables, I and II." Physical Review, 85(2), Jan. 15, 1952, p. 166-179 (Part I); 180-193 (Part II).

30. Amnon Yariv, Optical Electronics, 3rd Edn., Holt, Rinehart and Winston, New York, 1985, p. 500-501. Quote: "If a scalar wave $E_1(r)$ propagates from left to right through an arbitrary but lossless dielectric medium, and if we generate in some region of space [say near Z = 0] its phase-conjugate replica $E_2(r)$, then E_2 will propagate backward from right to left through the dielectric medium, remaining everywhere the phase-conjugate of E_1."

31. W. A. Rodrigues, Jr. and J.-Y. Lu, "On the existence of undistorted progressive waves (UPWs) of arbitrary speeds $0 \leq v < \infty$ in nature," Foundations of Physics, 27(3), 1997, p. 435-508. A slightly corrected edition of the paper was placed on the Los Alamos National Laboratory web site.

32. J. O'M. Bockris, "Overpotential: a lacuna in scientific knowledge," Journal of Chemical Education, 48(6), June 1971, p. 352-358.

33. J. O'M. Bockris and A.K.N. Reddy, Modern Electrochemistry, Vol. 1 & 2, Plenum Press, 1970, particularly Chapter I.

34. Rod Donnelly and Richard Ziolkowski, "Electromagnetic field generated by a moving point charge: A fields-only approach," American Journal of Physics, 62(10), Oct. 1994, p. 916-922.

35. Robert A., Fisher, Ed., Optical Phase Conjugation, Academic Press, New York, 1983.

36. Myron W. Evans, Enigmatic Photon, Vol. II, Kluwer, ISBN 0792332881; — "The photomagneton B(3) and electrodynamic conservation laws," Foundations of Physics Letters, 7(2), 1994, p. 209-217; — "The photomagneton B(3) and longitudinal ghost field B(3) of electromagnetism," Foundations of Physics Letters, 7(1), 1994, p. 67-74. Particularly see Apeiron, 4(2-3), Apr.-Jul. 1997, B(3) field issue, guest editor Myron W. Evans. In the same issue, see particularly the Introduction by Evans, and also his "Helicity and the Electromagnetic Field."

37. T. W. Barrett, "Sagnac Effect: A Consequence of Conservation of Action Due to Gauge Field Global Conformal Invariance in a Multiply-Joined Topology of Coherent Fields," in T. W. Barrett and D. M Grimes. [Eds.] Advanced Electromagnetism: Foundations, Theory, & Applications, World Scientific, Singapore, 1995, p. 278-313; — "Electromagnetic Phenomena Not Explained by Maxwell's Equations," in A. Lakhtakia

(ed.), Essays on the Formal Aspects of Electromagnetic Theory, World Scientific, River Edge, NJ, 1993, p. 6-86.

38. Jean-Pierre Vigier, "Relativistic Interpretation (with Non-Zero Mass) of the Small Ether Drift Velocity Detected by Michelson, Morley, and Miller," Apeiron, 4(2-3), Apr.-Jul. 1997.

39. Ziolkowski circa 1985 rediscovered the infolded EM structure of the scalar potential. He added the product set to Whittaker's 1903 sum set, thereby advancing the theory. Since then, apparently he has not recognized or addressed the fact that this internal longitudinal EM wave structuring of potentials, fields, and waves represents an infolded, powerful general relativity (spacetime engines) inside ordinary electrodynamics itself.

40. Barrett certainly noticed and stated the internal Stoney-Whittaker structuring of the potential, and hence fields and waves, but apparently has not gone further with it.

41. Patrick Cornille, "Inhomogeneous Waves and Maxwell's Equations," Chapter 4 in Essays on the Formal Aspects of Electromagnetic Theory, Aklesh Lakhtakia, Ed., World Scientific, New York, 1993. Cornille clearly shows that Maxwell's equations are directly created by scalar potential interferometry. As he states, this means that EM force field waves are created by the interference of sound-type scalar potential waves, or "sound creates light."

42. John Archibald Wheeler and Richard Phillips Feynman, "Classical electrodynamics in terms of direct interparticle action," Reviews of Modern Physics, 21(3), July 1949, p. 425-433; — "Interaction with the absorber as the mechanism of radiation," Reviews of Modern Physics, 17(2/3), Apr.-July 1945, p. 157-181.

43. P. K. Anastasovski, T. E. Bearden, C. Ciubotariu, W. T. Coffey, L. B. Crowell, G. J. Evans, Myron W. Evans, R. Flower, S. Jeffers, A. Labounsky, B. Lehnert, M. Mészáros, P. R. Molnár, J.-P. Vigier, and S. Roy, "The New Maxwell Electrodynamic Equations: New Tools for New Technologies," Journal of New Energy, 4(3), Special Issue of AIAS papers, Winter 1999. 60 papers by the Alpha Foundation's Institute for Advanced Study, advancing electrodynamics to a non-Abelian, gauge theoretic higher topology theory in (O)3 internal symmetry.

44. I. J. R. Aitchison, "Nothing's plenty: The vacuum in modern quantum field theory," Contemporary Physics, 26(4), 1985, p. 333-391. A good overview of the active vacuum.

45. Owen Flynn, "Parametric arrays: A new concept for sonar," Electronic Warfare Magazine, June 1977, p. 107-112.

46. M. I. Dykman *et al.*, "Noise-enhanced heterodyning in bistable systems," Physical Review E, 49(30), Mar. 1994, p. 1935-1942.

47. David Jones, Vancouver Sun Times, Weekend Magazine, Dec. 17, 1977, p.17.

48. Craig F. Bohren, "How can a particle absorb more than the light incident on it?", American Journal of Physics, 51(4), Apr. 1983, p. 323-327.

49. H. Paul and R. Fischer, "Comment on 'How can a particle absorb more than the light incident on it?'," American Journal of Physics, 51(4), Apr. 1983, p. 327.

50. V. S. Letokhov, "Laser Maxwell's demon," Contemporary Physics, 36(4), 1995, p. 235-243. See also V. S. Letokhov, "Generation of light by a scattering medium with negative resonance absorption," Soviet Physics JETP, 26(4), Apr. 1968, p. 835-839. This is a theoretical analysis of the generation of light by a scattering medium with negative resonance absorption or gain. This analysis requires that a photon mean free path be much smaller than all of the dimensions (R) of the active scattering region. A condition for generation threshold is given. Letokhov also provides a theoretical analysis of scattering particles that are distributed in a gaseous medium with negative absorption, such as a He-Ne or He-Xe gas mixture excited by an electric discharge. The scattering particles are said to effect a non-resonant feedback, while the gaseous active medium effects resonant amplification. See also V.S. Letokhov, "Stimulated emission of an ensemble of scattering particles with negative absorption," ZhETF Plasma, 5(8), Apr. 15, 1967, p. 262-265.

51. M.W. Evans, P. K. Anastasovski, T. E. Bearden et al., "On Whittaker's F and G Fluxes, Part III: The Existence of Physical Longitudinal and Timelike Photons," Journal of New Energy, 4(3), 1999, p. 68-71.

52. David M. Pepper, "Applications of Optical Phase Conjugation," Scientific American, 254(1), Jan. 1986, p. 74-83. See particularly the striking photographic demonstration of time reversal of disorder on p. 75, which directly demonstrates the principle cited.

53. T. D. Lee, Particle Physics and Introduction to Field Theory, Harwood, New York, 1981, p. 184, 380-381; — "Weak Interactions and Nonconservation of Parity," Nobel Lecture, Dec. 11, 1957; — "Can Time Be a Discrete Dynamical Variable?", Physics Letters, 122B(3, 4), Mar. 10, 1983, p. 217-220. Examines possibility of time as a discrete dynamical variable, across the range of mechanics: from classical to nonrelativistic quantum mechanics, and then to relativistic quantum field theories. In all stages of mechanics, time can be treated as a discrete parameter, and it can also be treated as a bona fide dynamic variable. See also T. D. Lee, "Space Inversion, Time Reversal and Particle-Antiparticle Conjugation," Physics Today, 19(3), Mar. 1966, p. 23-31.

54. H. J. Gray and Alan Isaacs, Eds., A New Dictionary of Physics. Longman Group Limited, London, 1975. Revised Edition. Quote, p. 151-152: *"Displacement current. The rate of change of electric flux with respect to time through a dielectric when the applied electric field is varying. When a capacitor is charged the conduction current flowing into it is considered to be continued through the dielectric as a displacement current so that the current is, in effect, flowing in a closed circuit. Displacement current does not involve motion of the current carriers (as in a conductor) but rather the formation of electric dipoles (a phenomenon known as dielectric polarization), thus*

setting up the electric stress. The recognition by Maxwell that a displacement current in a dielectric gives rise to magnetic effects equivalent to those produced by an ordinary conduction current is the basis of his electromagnetic theory of light." [For the purposes of this invention, our comment is that placing an irradiated EM flux upon the surface of the body produces just such displacement current via dielectric polarization, throughout the body since the body acts as a capacitor. Hence one can use a specific set of ordinary EM irradiations of the body to produce a specific set of dielectric polarizations throughout the entire body. It follows that irradiation from the body also is associated with polarization relaxations and changes within the entire body. It then follows that if the exact field pattern emitted by the body is precisely returned to the body, exactly opposite polarizations are produced throughout the body dielectric. Further, if these reinserted "natural emission radiations" are amplified before re-inserting, the EM-driven processes in the entire body dielectric can be reversed in direction. Each polarization and its dynamics involves a formation of EM longitudinal phase conjugate wavepairs and their dynamics, since all EM fields, potentials, and waves are comprised of such LW wavepairs and dynamics, per Whittaker 1903 and 1904. This means that the optical pumping type operations ongoing in the body can also be time-domain pumped by the time-polarized EM waves associated with the Whittaker processes, as can be seen from Mandl and Shaw's Quantum Field Theory, and from Bearden's Giant Negentropy of the Common Dipole. Indeed, this time-reversal of damaged cells, back to a previous healthy physical state, is accomplished by the cellular regeneration system of the body as the mechanism used to heal cellular damage and disease.]

55. G. C. Reali, "Reflection from dielectric materials," American Journal of Physics, 50(12), Dec. 1982, p. 1133-1136. The reflected EM field emitted from a dielectric material is not generated just at its surface but comes from everywhere in the interior of it. [Reversing this principle, the impinging of EM radiation upon a dielectric material, such as the human body, results in effects everywhere in the interior of the body dielectric.]

56. Mendel Sachs, "Symmetry in Electrodynamics: from Special to General Relativity; Macro to Quantum Domains" in Modern Nonlinear Physics, Second Edition, M. W. Evans (ed.), Wiley, 2002 (in press); — General Relativity and Matter: A Spinor Field Theory from Fermis to Light-Years (Fundamental Theories of Physics), Reidel (now Kluwer), 1982. Provides a great generalization of general relativity and electrodynamics reaching from the quarks and gluons to the entire universe. See also Mendel Sachs, Quantum Mechanics from General Relativity: An Approximation for a Theory of Inertia, Reidel (now Kluwer), 1986; — "Relativistic Implications in Electromagnetic Field Theory," in T. W. Barrett and D. M. Grimes, eds., Advanced Electromagnetism, World Scientific, 1995, p. 541-559; — "On Unification of Gravity and Electromagnetism and the Absence of Magnetic Monopoles," Nuovo Cimento, Vol. 114B, 1999; — The Field Concept in Contemporary Science, Charles C. Thomas Publishers, 1973. See also M.W. Evans, "The Link between the Topological Theory of Ranada and Trueba, the Sachs Theory, and O(3) Electrodynamics," in Modern Nonlinear Optics, Second Edition, Editor M.W. Evans and S. Kielich, 2002 (in press), a special topical issue of I. Prigogine and S. A. Rice, series eds., *Advances in Chemical Physics*, Wiley, New York.

57. B. Lehnert and S. Roy, Extended Electromagnetic Theory: Space-Charge in Vacuo and the Rest Mass of the Photon, World Scientific, New Jersey, 1999. Extended forms of Maxwell's equations as well as EM fields, based on a nonzero divergence of the electric field and a nonzero electric conductivity in vacuo. Predicts the existence of both longitudinal and transverse solutions, space charge in vacuo, steady EM equilibria, a photon rest mass and a photon axial magnetic field. [For the purposes of this invention, we point out that normal classical electromagnetics assumes a flat local spacetime (falsified by general relativity for nearly a century) and no net exchange with the local active vacuum (falsified by particle physics for a half-century). When the real system – with local curvatures of spacetime and local net energy exchange between the local active vacuum and the system – is analyzed, the electromagnetics must be extended to include such interactions. Lehnert and Roy show that in the real case the photon is not massless but has mass. Hence, by delivering photon energy everywhere within the real physical body that is precisely accepted and involved in all the body's ongoing processes, the process involved in the invention is also delivering mass and mass-energy as necessary. This is not the normal photon interaction in an assumed flat spacetime, but is a different kind of photon-with-mass interaction in a curved spacetime. In this way, actual mass changes can be produced in the various minute ongoing body dynamics and interactions as required to eliminate the physical differences between the present mass-energy of the body in a diseased or disordered state, and the past mass-energy of the body in a healthy and normal state.]

58. M.W. Evans et al., "On Whittaker's Representation of the Electromagnetic Entity in Vacuo, Part V: The Production of Transverse Fields and Energy by Scalar Interferometry," Journal of New Energy, 4(3), Winter 1999, p. 76-78.

59. T. E. Bearden, "Porthole Briefing", 108 slides, attached and made a part of this PPA.

METHOD, SYSTEM AND APPARATUS FOR CONDITIONING ELECTROMAGNETIC POTENTIALS, FIELDS, AND WAVES TO TREAT AND ALTER MATTER

This invention pertains to the treatment of matter with electromagnetic energy to cause specified changes in the matter. More particularly, this invention deals with methods, systems and apparatus for the creation and application of conditioned electromagnetic potentials, fields, and waves, wherein the conditioning comprises the selection and combination of identified constituent electromagnetic waves, in order to produce desired interactions with matter. The

matter may be chemicals, nuclear materials, living cells, and the like, and the results of the interactions may be the time-reversal of the matter to a previous state, or the application of a chosen delta to the matter's current state, so as to effect desired chemical reactions, nuclear reactions, or biological changes, respectively. The invention covers two versions of the conditioning process, depending upon whether EM conditioning is externally accomplished or internally accomplished. The two versions of the process are: (1) the formation of the conditioning of the electromagnetic potentials, fields, and waves outside the body, and then irradiating the body with EM radiation carrying the desired conditioning, and (2) the irradiation of the body dielectric with the same EM waves, fields, and potentials emitted by the body dielectric, but amplified. In the latter process, the formation of the desired conditioning of the induced EM potentials, fields, and waves into every part of the body is accomplished by the highly nonlinear characteristics of the body and cellular material at every level, in every location in the body dielectric.

SUMMARY OF THE INVENTION

The present invention exploits the fact that all electromagnetic fields, potentials, and waves are composed of more fundamental electromagnetic structures. To directly engineer spacetime and induce desired changes in matter – specifically the mass-energy of the body dielectric, in all parts and dynamics – the invention uses and applies these more fundamental electromagnetic structures, which constitute curvatures of spacetime capable of directly affecting and changing matter according to the exact pattern and dynamics of the internal structures.

The invention also utilizes a known but novel "dielectric channel" effect wherein every part of a dielectric participates in the absorption and emission of a photon or of an electromagnetic wave, at any point on the surface of the dielectric. It further uses the unique properties of the difference frequency between two frequencies. While the transmitted waves themselves are subject to overshoot and breakup in an isotropic nonlinear medium, the difference frequency passes through the dielectric medium unchanged. In this way the difference frequencies rather than the actual transmitted frequencies are considered as the <u>active</u> transmission frequencies communicating everywhere within the body and all its cells. Thus the

desired difference frequency signals can be and are delivered to every point in the entire body dielectric medium, and the response from every point in the entire body dielectric medium participates in the electromagnetic signals emission from the body.

A scalar potential is just a bundle of bidirectional longitudinal electromagnetic waves, in pairs, where each pair consists of an incoming time-polarized EM wave (EM energy moving along the time-axis) and an outgoing longitudinal EM wave in 3-space. That is the nature of the potential as it exists in spacetime (in 4-space) prior to interaction with charged mass. The halfset of all the outgoing 3-space longitudinal waves also forms a set of 3-space EM wavepairs comprising the 3-potential portion. Any electromagnetic field or wave may be decomposed into two scalar potentials, as shown by Whittaker in 1904, thus initiating that branch of electrodynamics known as **superpotential theory**. Everything that is presently recognized as an ordinary electromagnetic field or transverse electromagnetic wave is in fact created through the interference of potentials' internal longitudinal EM wave structures, as shown by Evans et al. and also by Cornille. This extended superpotential approach is a legitimate higher group symmetry – such as O(3) symmetry – electrodynamics, which is more fundamental and extensive than orthodox electrodynamics using U(1) group symmetry. The extended electrodynamics provides an electrodynamically engineerable unified field theory that is capable of directly changing matter through action-at-a-distance, including time-reversing matter (either living or inert), through the manipulation of the internal longitudinal wave pairs with associated time-polarized EM waves. The present invention provides methods, systems, and apparatus to engineer and utilize this new electrodynamics as a means of conditioning and altering materials.

The invention addresses all the steps in such a process. First, it provides methods to convert transverse electromagnetic waves into longitudinal waves, which are always accompanied by one-to-one correlated time-polarized EM waves with exact phase conjugate pairing. It then advances techniques to combine collections of input waves into a conditioned scalar potential, being a scalar potential containing a desired modification to its internal structure and internal dynamics. Moreover, it gives means to transmit the conditioning over a distance, and reconstitute the input transverse waves in a target zone through interference therein or thereupon. It also provides for recording, digital processing, and synthesis of engineered waveforms that can be used in conjunction with these embodiments. By combining the aforesaid

functions, embodiments are provided to solve problems of environmental pollution, nuclear waste, hazardous chemicals, disease, biological warfare, and so forth, by deterministically altering and treating living or inert matter. These are all secondary goals that can be achieved by engineering higher group symmetry electrodynamics at the more fundamental level.

Most centrally, the invention advances a practical means, using the above scheme, to treat living cells and living bodies, in order to reverse disease and damage. In summary this is done by irradiating a body with longitudinal EM waves, which are always accompanied by correlated time-polarized EM waves. The longitudinal EM waves and their correlated time-polarized EM waves may be produced externally to the body, or triggered to be produced internally within the body. In either case, in the body dielectric the accompanying time-polarized EM waves pump the mass-energy of the body mass (including all cells and every part of each cell) in the time domain rather than the spatial domain. This is an extension of present nonlinear phase conjugate optics, which has until now only considered spatial EM pumping and has omitted time-domain EM pumping.

The normal phase conjugation process produces the time-reversal of planar EM wave energy in 3-space, as stated in the well-known **distortion correction theorem** [See Yariv, 30]. In short, it produces a planar wave that precisely retraces the exact 3-space path in the transmission medium, point for point, previously taken by the stimulus wave. In the new process, 3-dimensional EM energy is retraced back along the previous time-path taken by the stimulus 3-space energy – which latter is simply the resident mass-energy of the time-domain pumped mass, together with the internal structuring and dynamics of that mass-energy. The extended phase conjugation process resulting from the time-domain pumping is applied to the nonlinear "input" 3-space mass-energy as it previously traveled through time, rather than being applied to an "input" plane wave energy in 3-space as it has traveled through space. The result is that, analogous to normal reversal of the 2-dimensional planar EM wave energy in 3-space, the pumped 3-dimensional mass-energy and its exact dynamics are reversed back along the time axis, to a previous 3-dimensional physical mass-energy state and dynamics. Since all the mass energy and its dynamics in the pumped 3-space mass are thusly time-reversed, the process also time reverses not just one but all the electromagnetic signal energy and EM process energy ongoing in the body's mass-energy, thereby time-reversing all of the body’s biological, chemical,

and nuclear processes back through a precession through previous states to arrive at a previous healthy physical state. Because of the dielectric channel effect, every part of the body cells including the genetics are also precisely time-reversed through previous states to arrive at a previous healthy physical state.

It is further pointed out that, in a curved spacetime, the photon may be said to have mass, as shown by Lehnert and Roy [57]. Any change of energy or dynamics in spacetime, including electromagnetic energy or dynamics, constitutes a curved spacetime as is well known in general relativity. Hence the invention deliberately uses photon energy which also possesses mass, contrary to normal electrodynamics in a flat spacetime. In this way mass may be added or subtracted from the tiniest parts of the cells, in accordance with the time-reversal back of the time-domain-pumped cells back through their intermediate physical states to an earlier healthy physical state.

This is in fact the normal healing mechanism discovered by the inventor and used by the cellular regenerative system of the human body, within its limitations, to heal damaged cells and gradually restore them to a previous normal condition. Becker, e.g., demonstrated that weak potentials indeed time-reversed (in biology terms, dedifferentiated) red blood cells, then continued to "eliminate the deltas" in the previous bone-fracture area by then redifferentiating the resulting cells into the type of cells that make cartilage, then further into the type of cells that make bone, and depositing the latter cells in the fracture site to heal the fracture. In all these rigorously demonstrated changes, the mass of the cells was also being manipulated, although Becker was unable to decipher the mechanism accomplishing that feature.

In the present case, the time-reversed waves comprising the body's mass-energy are amplified by the pumping energy pumping the cells and their constituent atomic particles and subatomic particles in the time-domain and causing their time-reversal.

In addition, a much shorter method of accomplishing this amplified time-reversal of cells and their processes is provided by one version of the invention. The body is highly nonlinear in every part of itself, including the cell and every part of the cell. Consequently the nonlinearity of the cellular material can be made to partially decompose normal EM potentials, fields, and waves

– transmitted into the body from outside – into their Whittaker longitudinal EM wavepair constituents, to include their accompanying time-polarized EM waves in the time-domain.

This can be seen by the "porthole" concept, where the internal body EM dynamics are regarded as a set of light-type or optical-type interactions ongoing everywhere within the body and its cells. We are not referring to optical frequencies, but to optical-type functioning. It is known in electrodynamics that in a dielectric, such as the body, every part of the dielectric participates in each photon emission from the body surface [Reali, 55]. A differential area on the body's surface thus represents a special sort of "porthole" where the EM radiation (together with its internal Whittaker structuring) that is emitted is a direct function of all the internal EM dynamics ongoing in the body and every part of the body, down to the smallest level inside the cells. It follows that, if we record that external emission, and input it again to that body differential surface area, we are returning energy in reverse. Note that we are also directly utilizing the difference frequencies, which are the most important. Specifically we are returning, back through the dielectric and to all those EM processes everywhere within the body, a set of precise counter-forces and dynamics for the ongoing forces and dynamics. If we amplify the irradiation back to that differential surface of the body, the excess energy returned to all the processes in the body will slightly amplify and partially time-reverse all those EM interactions ongoing in the body cells. Specifically, this process will act to eliminate the "deltas" between the present interactions and dynamics and the body's past normal interactions and dynamics, since time-reversal rather than spatial reversal is involved. It is stressed that the 3-space forces affected, continue to operate in a "time-forward" manner, but are slowly and steadily changed in direction, phase, and magnitude by the existing "time-domain" delta between the present state at any given time in the pumping and the past healthy state to which the pumping is changing the ongoing dynamics, physics, and chemistry of the functioning cells.

The photon is its own antiparticle. That is, an antiphoton is simply a photon reversed in direction. So for any photon radiation pattern we can create antiphoton radiation comprising its precise antipattern, merely by precisely reversing the direction of photon radiation of that pattern. If we amplify the reversed direction radiation, we amplify the antiphoton radiation pattern so that it is stronger than the body's own emitted photon radiation pattern. This

antipattern is forcibly transmitted through the porthole effect into all internal regions of the body, no matter how small.

To make a powerful effect, we record all the normal EM radiation from the body, from all its surfaces or a substantial portion thereof and including the difference frequencies, amplify this received radiation precisely, and feed it back precisely into the same body. We thereby much more strongly amplify the counterforces and time-reversals in those processes throughout the body. In short, from a physics view we overcome the body mass-energy's movement through forward time, and place it into simultaneous reversed-time movement along the time axis of 4-space, back to a previous point in time, changing its mass-energy and mass-energy dynamics as it reverses. We point out that both "movements through time" of the operating cells and their internal parts continue to exist vectorially; the body's mass energy is still moving through forward time at the same velocity, but is simultaneously moving through reversed time at a greater velocity. Hence the net movement of the mass-energy and its dynamics, as seen by the external observer, is a movement in reversed time, which thus is purely a "movement to eliminate the deltas between the present unhealthy state and the past healthy state". However, this is actually a set of very precise dynamic changes and forces, being imposed upon the mass-energy of the body, to change it back to a previous physical state before the cellular damage or disease. But the body mass-energy remains "normally alive" with all its ongoing functions during this process, and only net "deltas" are induced. So the living body's functions are not disrupted in a detrimental sense, but in a very positive sense known as "healing" – i.e., time-reversing the body and its dynamics back to a previous healthy state. The foregoing in fact may be taken as the definition of cellular healing itself.

The overall result is to time-reverse (physically) the cells and processes of the body back to a previous earlier physical state and condition. Any healthy part of the body's cells and cellular dynamics is simply made a little younger (rejuvenated). Any diseased or damaged cell or group of cells and their dynamics, is/are time-reversed back to their previous healthy condition (healed). This process is actually an amplification and application of the natural, but more limited, healing process the cellular regenerative system of the body has used for millennia.

For emergency conditions in mass casualty situations, the amplification of the time-reversal can be increased to where a treatment of only one minute is required, but with some discomfort and stress to the patient. A lesser amplification and two to three minutes radiation can be used to eliminate most discomfort, if the situation is still urgent. Three such treatments one week apart are the normal requirements. In normal situations, a treatment of 15 to 30 minutes at reduced amplification is indicated, so that the discomfort and stress is eliminated. Again, three such treatments one week apart are indicated.

This latter version of the invention – letting the body dielectric itself produce the pumping longitudinal EM waves and time-polarized EM waves everywhere within the body dielectric – greatly simplifies the accomplishment of the time-domain pumping process of the invention. It can thus be adapted to provide for portable treatment units, approximately the size of a large suitcase, which are suitable for the very rapid mass treatment of mass casualties – even in the millions – utilizing the aforesaid principles. Due to the novel mechanism used, the invention is applicable to a wide variety of infectious diseases and physical disorders.

BACKGROUND

This invention is largely based upon the application of some advanced new principles that exist in physics as shown by the references, but which have not yet gained widespread application in the scientific community and have not been applied in the engineering of electronic equipment or in the medical community. Hence a thorough discussion of the invention's background and theoretical basis is necessary to convey an adequate understanding of the invention, the scope of its various embodiments and variations, and how it may be practiced.

In initiating superpotential theory, in 1904 E. T. Whittaker [2 (b)] showed that any electromagnetic field or wave could be considered as two scalar potential functions, and in 1903 he had previously shown [2 (a)] that any scalar potential has an internal composition of harmonic bidirectional EM longitudinal wavepairs. It follows that any EM field or wave or potential can be decomposed into a more primary structure of harmonic bidirectional EM waves and their dynamics. Melba Phillips, "Classical Electrodynamics," provides an overview [1] of the

superpotential theory initiated by the 1904 Whittaker paper. A thorough discussion summarizing, reinterpreting and extending E. T. Whittaker's 1903 and 1904 work, upon which the present invention is founded, can be found in the present inventor's paper "Giant Negentropy from the Common Dipole" [28]; its teachings are incorporated herein by reference. This reinterpretation is also consistent with broken symmetry known in particle physics [53] since 1957, and is also strongly supported by quantum field theory, as given in the standard text by Mandl and Shaw [27]. However, electrical engineers have never attempted to design and utilize equipment producing and using longitudinal EM waves in space and accompanied by correlated time-polarized EM waves, as does the present invention.

The necessary expansion of electrodynamics to embed EM in a higher-topology algebra such as quaternions or Clifford algebra has begun and is well along in physics, resulting in novel and revolutionary longitudinal-EM wave solutions to wave equations, etc. Summary papers by Rodrigues *et al.* [31] are particularly applicable, as is the B(3) electrodynamics work of Evans [36], Barrett [37], and Vigier [38], and the longitudinal EM wave work of Ziolkowski *et al.* [34] Nonetheless, with the exception of Ziolkowski [39], Barrett [40], and Cornille [41], few theorists have yet dealt with the Whittaker [2] and Bohm [29] infolded "hidden variable" longitudinal electrodynamics required for a thorough understanding of the present invention. Admittedly, this is a difficult subject, as completion of the theoretical work to produce a unified field theory uniting general relativity with electrodynamics is still in progress in physics, notably in the remarkable unified field theory work of Sachs [56], as further implemented by the higher symmetry O(3) electrodynamics spearheaded by Evans et al. [36, 43, 56]. The present invention takes these developments as its starting point, and goes slightly beyond them to include phase conjugate optical functioning in the time-domain (the fourth Minkowski axis), to further advance the state of the art. However, this extension is fully supported by quantum field theory [27] and by O(3) electrodynamics.

F. Mandl and G. Shaw [27] recognize four possible polarizations of the photon. The two spatial polarizations that yield common transverse electromagnetic (EM) photons and thus transverse EM waves are generally well known. They involve vibrations at a right angle to the axis of travel. For example**, transverse polarization** – for a wave in 3-space traveling parallel to

the z-axis – may be parallel to the x-axis or the y-axis, yielding two distinct modes of spatial transverse polarization. Any combination of the two is still transverse polarization.

The third and fourth polarization types, both longitudinal, are less well known, and terminology for them is not well established. **Longitudinal polarization** means vibration to and fro along the axis of travel. The term **average velocity** is applied to longitudinal waves because their oscillation along the line of travel causes their velocity to change from peak to trough. Thus, longitudinal waves are sometimes (rarely) referred to as **galloping waves**. Spatially longitudinal polarization (the third type) involves vibration along the axis of travel in 3-dimensional space. The vibrations of such a wave traveling along the z-axis, e.g., are parallel to the z-axis. The wave may be moving along the x, y, or z axis or along some combination of them. We will refer to this as "**longitudinal polarization**" and the resulting waves may be called "**longitudinal EM waves**," "**LW**s," "**longitudinal surge waves**," or "**galloping waves**." When used without a qualifier, "spatially longitudinal" should be understood by use of the word "longitudinal".

The fourth type, **time-polarization,** entails vibration along the axis of travel in the time-axis (as defined in Minkowski spacetime). Such a wave may be referred to as a "**time-polarized wave**", "**time-density wave**", "**time-like wave**", "**electrogravitic wave**", "**scalar potential**" wave, or in some cases (infinite velocity) as "**quantum potential**". For the purposes of this disclosure, these terms are used equivalently, depending on the velocity involved. Such a wave should be understood to comprise traveling oscillations in the density of the time-energy component of space-time, i.e. periodic dilation and compression of the rate of flow of time, along the direction of travel. In general relativity terms it is a traveling oscillating rate of time dilation and compression. Since time-polarized waves associate with longitudinal EM waves in 3-space on a 1:1 correlation basis, the time-polarized EM wave always accompanies the longitudinal EM wave, and vice versa, whenever any observable effects are apparent.

A further explanation follows concerning the time density of a wave, and the variation or oscillations of that time density.

Present electrodynamics erroneously omits the transport by electromagnetic waves of time-domain dynamics and considers only the transport of spatial energy and dynamics. That EM waves do indeed transport time energy can be seen by considering an EM wave as transporting photons. Each photon is comprised of angular momentum. Angular momentum is calculated as the product of energy and time (energy x time). Thus every photon carries not only an increment of energy but also an increment of time. The transport of a "piece of time" by each photon, and the involvement of time and time-energy in every photon-particle interaction, is not addressed by present-day physics prior to the present invention, outside of the very few researchers cited herein. Thus a dynamic assembly of photons – such as an EM wave – carries a dynamic spatial energy density structuring (via the dynamics of the energy components of its photons) and also a time density structuring (via the dynamics of the time components of its photons). "Dynamic" as used herein simply means "changing", and "**dynamics**" is the noun referring to such change.

A scalar potential carries "**hidden variables**" or "**hidden information**" [see Whittaker 2(a)] – i.e., infolded longitudinal EM wave information undetectable with conventional instruments adapted for detecting only traverse waves – in the precise frequency, phase angle, and magnitude (amplitude) composition of its constituent longitudinal EM wave parts. These properties of the constituent parts are sometimes called the internal "**dynamics**". When additional internal information carried by a scalar potential has been deliberately placed there, through processes such as those disclosed in the present invention, the scalar potential is said to be "**conditioned**". It may also be said to have a "**deterministic substructure**" or an "**engine**" or a "**spacetime curvature engine**". The hidden information is said to be "**infolded**" and may subsequently be reconstituted by constructive interference between two conditioned potential waves. Such conditioning is totally different from the well-known spectral decomposition of wave systems.

As shown by Whittaker [2 (b)], any EM field or wave can be decomposed into two scalar potential functions. Each potential of the two can be further decomposed into an internal set of Whittaker longitudinal phase conjugate wavepairs [Whittaker 2 (a)]. Hence these two Whittaker-structured potentials and their external and internal dynamics comprise any EM wave or field or complex thereof. It follows that EM fields and waves also carry internal EM

structural dynamics, and hence can also be dimensioned by insertion of extra structure and dynamics (engines) during the production of the fields or waves.

By extension of Wheeler's general relativity principle [42] and the O(3) unified field theory advanced by Evans, Bearden, *et al.* [43], an EM wave's energy may be understood to be equivalently an oscillating curvature of spacetime. Mass-energy (trapped energy, by $E = mc^2$) and its structure and dynamics curves and structures spacetime also. Thus the conditioning on and in a wave – when created deterministically from specific constituent waves (i.e. spacetime curvatures) – may also be referred to as a "**spacetime curvature engine**" since it is intended to produce, and can produce, specified changes in matter, energy, and spacetime. Such conditioning may also be called a "**vacuum engine**" or **engine** since it exploits energy-density vibrations of the virtual particle flux of the quantum-mechanical active vacuum [44] due to the reaction of dimensioned spacetime upon said vacuum. Spacetime curvature engines produce forces on mass components, telling them how to move and structure and forcibly changing their dynamics and structure. Since the present invention uses very strong electromagnetic force as an agent of curvature and dimensioning, very powerful general relativistic effects can be obtained through proper selection of the input waves, providing for the direct engineering of general relativity in every part of every cell of the body, by the new devices of unparalleled capability.

The present invention makes heavy use of principles of nonlinear optics as a means of creating and conditioning longitudinal EM waves. This field deals with "**phase conjugation**", a term for the time-reversal of an electromagnetic wave, as will be described with reference to **Fig. 25A**. Modern nonlinear optics started slowly after a Soviet scientific briefing to Lawrence Livermore National Laboratory in 1972, as noted by Fisher [35], and by 1977-1980 had picked up momentum. "**Pumping**" in nonlinear optics, which may also be called multi-wave mixing or hereinafter just "**mixing**", refers to the nonlinear combining of input signals in a nonlinear medium in which potentials superpose and mix (see **Fig. 25B**). Superposition of transverse phase-conjugate wave pairs forms a transverse standing wave that cancels out the transverse polarization. Similarly, mixing of longitudinal phase-conjugate wave pairs causes the formation of a longitudinal standing wave that cancels out the spatially-longitudinal polarization. These principles are used in the transduction processes of the present invention.

Conventional nonlinear optics only addresses pumping by means of transverse electromagnetic waves, providing rhythmic "squeezes" of the energy density in the spatial domain only. Thus the only type of time-reversed wave that the *conventional* methodology is capable of emitting is one with a 2-dimensional wavefront, namely a transversely-polarized replica wave going in the opposite direction to the stimulus wave. To time-reverse a 3-dimensional mass itself, as contemplated by the present invention, it is necessary to create a 3-D wavefront, that being a longitudinally-polarized wave in the time domain accompanying a longitudinally-polarized EM wave in 3-space. Thus new methods of pumping by means of rhythmic squeezes of the energy density of the time domain are needed, methods that did not exist prior to the present invention.

The invention teaches the production of longitudinal EM waves accompanied by their 1:1 time-polarized waves. As will be explained with reference to **Fig. 1**, coupling a transverse EM wave with a perfect phase-conjugate replica of that wave produces a bidirectional longitudinal EM wave pair, similar to Whittaker [2 (a)], which is corrected and re-interpreted by the present inventor [28] to yield the proper *scalar photon/longitudinal photon pairs* in accordance with quantum field theory [27]. This is the fundamental mechanism to make longitudinal waves in 3-space at will, together with their accompanying time-polarized EM waves. Assembling a chosen set of conventional transverse EM waves **(**per **Fig. 4A**), and mixing the same in nonlinear phase-conjugating media, such as ionized noble gases or mixtures thereof, yields phase-conjugate replicas of some of the conventional transverse EM waves. In that fraction, the conventional transverse EM waves coupled with their respective phase-conjugate replicas constitute bidirectional longitudinal EM wave pairs as re-interpreted (the causal wave in the time domain and the effects wave in 3-space). This fraction forms a scalar potential with a deterministic substructure in the manner shown by Whittaker [2(a)]. This potential may be referred to as a *conditioned* or *dimensioned* scalar potential, since its internal structure has been deterministically chosen by controlling the constituent input waves. **Figs. 8A-9B** are directed toward apparatus embodying this methodology, in order to create a conditioned scalar potential that may be used in other aspects of the present invention. In the potential, the "acting" wave components to act upon charges are the incoming time-polarized EM waves, while the effect of the interaction is the emission of the longitudinal EM waves.

Moreover, interaction with a single charged particle automatically converts any longitudinal EM wave into a time-polarized EM wave, and the interaction of any time-polarized EM wave with a single charged particle automatically converts the wave into a longitudinal EM wave in 3-space. In the vacuum, there are always charge fluctuations (virtual charged particles) present, from the viewpoint of quantum mechanics. The vacuum interaction continually transduces a spatially-longitudinal EM wave reaction with a particle into a time-density wave interaction with the particle, and vice versa. This is ubiquitous, since any virtual or observable mass may be considered totally nonlinear with respect to a longitudinal wave's interaction with it. Hence any interacting mass containing charges will phase conjugate any longitudinal EM wave, regardless of frequency, and that interaction creates time and space as well as spacetime. Any ordinary "uncharged" mass includes nucleons (protons and neutrons) as well as electrons. The nucleons consist of charged quarks, hence even "inert" matter is totally charged. Hence the interaction and wave polarization transduction are ubiquitous.

The invention also provides other methods of phase conjugate production. In and near the optical frequency band, conventional nonlinear optics can add phase-conjugate replica waves to incident transverse waves. At radar frequencies, waveguide plumbing can add phase-conjugate replicas. For lower frequencies (as will be described with reference to **Figs. 8B, 9A** and **9B),** plasmas can be utilized, since certain plasmas possess the unique characteristic of producing a longitudinal wave from a transverse wave, and vice versa. In addition, exact but complicated mixes of specifically selected transverse EM wave complexes may be radiated into the living body, where the extreme nonlinearity of the body provides the plasma-like transduction into longitudinal and time-polarized EM waves and "engine structures and dynamics".

We will speak of longitudinal EM waves in 3-space, but always we bear in mind that every longitudinal EM 3-space wave is automatically accompanied by a time-polarized EM wave and vice versa. The ongoing transduction process – between time-polarized and longitudinal waves and/or photons – is what a scalar potential *identically is*.

In general, longitudinal EM waves interact only weakly with matter. They can pass directly through the ocean or the entire earth with minimal attenuation because of the weak

reaction cross section with the mass particles of the ocean and earth. Mass is mostly empty space filled with EM fields, waves, and potentials, and at its own level its scale resembles that of a solar system. The internal EM fields, waves, and potentials between the greatly separated mass particles (at that level) are bundles of longitudinal EM waves and their dynamics. Hence mass is a *superhighway* for the passage of longitudinal EM waves and their dynamics, a priori.

The present invention also teaches several other processes for conditioning potentials. When the phase angles of two transverse EM waves of the same frequency and amplitude are 180 degrees out of phase, their *transverse vector components* sum to zero, transforming the two waves into an oscillating stress potential in 3-space, which is a longitudinal EM wave (accompanied always by its paired time-polarized EM wave). In other words, the spatial oscillation energy of the two antiphased transverse waves does not disappear – because energy can be neither created or destroyed – but instead it is transduced into stress potential oscillations of stress energy. These stress potential oscillations decompose into oscillating longitudinal EM waves and paired time-polarized EM waves. The important part is the time-polarized EM wave, which is an oscillation of flowing EM energy on the fourth Minkowski axis, and hence is flowing time energy. This fact has not been noticed prior to the present invention because longitudinal waves penetrate and pass through matter with little interaction, and conventional detectors are not adapted to detect them. Nonetheless, the existence of longitudinal waves has been shown empirically through the use of special detectors, and longitudinal photons are an standard part of quantum field theory [see Mandl and Shaw, 27].

Apparatus to exploit the above antiphasing principle for creating LWs (and their scalar EM wave counterparts) is based on the following concepts: In a coil, the current lags the potential (voltage) by 90 degrees. At electrical frequencies, when a potential is suddenly pulsed onto a coil, within a very short time the full potential may be measured across the coil, despite the infinitesimal magnitude of the initial current. Thus introducing a sharp pulse while other AC waveforms are already present and stable on the coil causes both sets of potentials and waveforms to superpose. This is because in a short interval after a pulse but before significant current has flowed (i.e., if the value for dq/dt – the change in charge over a small time interval – is small enough), all the waves and frequencies may be treated as a single instantaneous scalar potential. The embodiments shown in **Figs. 8A-9B** and **11B** exploit this intermixing principle.

Another variation is to deliberately use an overpotential in a gas [32, 33], where the initial potential on a gas in a tube may appreciably exceed its ionization potential, often by 20%. During this period, the overpotential accepts, mixes with, and fuses internal longitudinal wave pair structures with all other potentials present in the gas. **Fig. 9B** discloses an apparatus for an embodiment of the present invention that exploits the overpotential as a further means of conditioning waves and potentials. The overpotential method can be used to condition both the E- and B-fields (i.e. both electrical and magnetic fields).

The prevent invention also provides methods and apparatus to produce a quantum potential similar to Bohm's quantum potential [29]. However, unlike Bohm's, the present invention's quantum potential may be formed at will and deterministically structured (conditioned). **Figs. 10-11** teach production of a quantum potential from input transverse EM waves using phase-conjugate mirrors or other nonlinear reflectors or scatterers. By the distortion correction theorem of nonlinear optics [30], each reflection from such a mirror provides precise reconvergence back to the point of origin, also called "**self-targeting**". Iterative repetition (i.e., a series of reflections back and forth between two mirrors), sometimes called "**ping-ponging**", reduces the signal's transverse magnitude component toward zero until the initial wave pair eventually becomes entirely longitudinal. This process is explained, and exploited, in **Fig. 9C.** Note that we do not show the similar "zeroing" effect of the accompanying time-polarized waves in the time-domain, which "zero". Hence this potential exists in "zero change" for any two points in the universe that it will exist in. There is no time-lag in "appearance" of this quantum potential at all points in space that it will occupy. For a discussion of the prior art on retroreflection see Donnelly and Ziolkowski [34]. In such a system, the operating region where longitudinal polarization emerges and begins to predominate but before the transverse magnitude reaches zero is called the **pseudo-longitudinal wave pair** region. Here the waves' velocity $\boldsymbol{v}$ increases to a value exceeding the speed of light in vacuum $\boldsymbol{c}$, but remains finite. Actually, $\boldsymbol{c}$ is the limiting velocity in flat spacetime of a *transverse* wave or free *transverse* photon, not a *longitudinal* wave or *longitudinal* photon [see Rodrigues, 31]. If reconvergence continues, a second-order convergence starts where phase conjugation of the pseudo-LW pairs themselves rapidly eliminates the last remnant of transversality and the waves' speed becomes infinite as they become purely longitudinal. From Rodrigues' and Lu's theory of undistorted progressive

waves [31], a pure longitudinal wave has infinite energy and infinite spatial velocity. "Infinite energy" simply means that any amount of energy can be collected from it by sufficient interceptors. “Infinite velocity” simply indicates that the wave’s propagation into 3-space from the time axis is from the time-axis, rather than through 3-space, and the "lag" on that axis has been eliminated. Note that a single point in time co-exists with every 3-space point in the universe. If the energy entering 3-space from the time domain enters at multiple points instantaneously, the space is said to be "multiply connected". The result of such multiply connected space is a bidirectional longitudinal wave pair whose components appear to have infinite velocity, simply appearing everywhere in every point they will occupy, simultaneously. Hence energy and dynamics from a single point in time at one 3-space point in the universe, can be introduced into multiple other 3-space points simultaneously and instantly, constituting an "energy amplification". This is understood by visualizing the separated points seen in flat 3-space as superposed in a special kind of mathematical "folding" or "warping". In that case, any amount of energy that the three space observer inserts into one of those "folded superposed" points in his 3-space, will also simultaneously appear at each and every other of the (to him) separated points A quantum potential so created may be used in other aspects of the present invention, as will be explained more fully hereinafter.

Moreover, this invention teaches additional processes for conditioning potentials. **Fig. 10** shows how certain molecules in solution may be utilized for frequency ranges determined from their chemical resonance and anti-Stokes emission characteristics. Colloidal suspensions of active particles can also be utilized to partially perform the process, where the colloids are sized to a resonant frequency of the incident waves. Mixes of colloids can mix a multiplicity of input frequencies. Suspensions of larger particles or regular masses can be utilized if the liquid medium is agitated to keep the particles/masses in suspension. In theory, special arrays and lattices of material mixes – e.g. in solid suspension or in liquid suspensions – can also perform or augment phase conjugation.

The invention further teaches methods and uses for the interference of conditioned (dimensioned) scalar potentials. Whittaker [2 (b)] showed that the interference of two potentials can be used to form all EM fields and waves. What is interfering are the multiple longitudinal EM wave pairs comprising the two potentials. Thus, interference of scalar potentials is just a

special kind of multiple-wave interference, where the waves interfering are bidirectional longitudinal EM wave pairs. By Whittaker [2 (a) and (b)], it follows that, by conditioning potentials, fields, and waves to change their internal structures and then interfering them, the interference of said conditioning will create overt ordinary electromagnetic potentials, fields, and waves in the interference zone, which may be either local or non-local. An essential proof of this "scalar potential interferometry" has been given by Evans et al. [58]. When the interferometry is non-local, this technique provides the novel capability for engineerable action at a distance, in a manner presently missing from classical electrodynamics. The longitudinal waves carrying the conditioning can pass right through matter, such as a Faraday cage, without appreciable attenuation. **Figs. 15-20** and **Figs. 22-23** will illustrate embodiments employing interference of conditioned scalar potentials for various purposes.

The closest known prior art to the invention's deliberate engineering and use of time-reversal zones is the cold fusion experiments conducted by Pons, Fleischmann, and others in the mid 1990s. Those experiments had varying results. Some of the phenomena given herein do occur haphazardly and randomly in various cold fusion experiments. The cold fusion literature and patents do not disclose or suggest any of the novel processes and features of the present invention such as the calibration of palladium electrode loading to control the initiation time for time charging, time-charge decay, transduction, etc. as is done in the present invention.

An apparatus exploiting the production of a time-reversal zone to selectively enhance a nuclear reaction will be shown in **Fig. 24**. Methods for treating a mass by creating a particular spacetime engine will be shown in **Figs. 26A-26B.** This process can be applied to inert or living matter. By "steering" the process as the changes occur, substances harmful to the environment such as chemical and radioactive wastes can be altered into new harmless elements and compounds. Again we accent that the use of photons containing mass, in a curved spacetime, does allow induced change of mass in nuclei and materials by photon interaction, something not met with in normal electrodynamics. The process can be applied, for example, to alter harmful chemicals in the upper atmosphere that are depleting the ozone layer, thereby changing the ozone layer-damaging chemicals into harmless form and restoring the ozone layer.

Inert matter can thus be altered in any manner desired, to any state desired, depending only on the developed equipment embodiments and state of the art. All levels of the matter treated are affected, including molecules and their binding forces, atoms, atomic nuclei, nucleons, and even the quarks inside the nucleons themselves. Any kind of fundamental particle known can be affected and altered. A major use foreseen in the future is directly engineering the atomic nucleus by novel new electrodynamic means, using longitudinal EM waves and a major extension of nonlinear optics and general relativity. Transmutation of elements, transformation of isotopes, isomer transforms, chemical transforms, and material lattice transforms are directly engineerable. The application to processing chemical wastes and rendering them harmless will be apparent to one skilled in the art.

Every system is immersed in the passage of time and hence is in a continuous interaction with time-energy flow. Time-energy flow is a previously unrecognized "external energetic environment" in which any system is immersed and with which it continually interacts. Further, time is spatial energy compressed by the factor c2, so time has similar energy density as mass. Use of conversion of time-energy to spatial energy – i.e., decompressing time into spatial energy – is equivalent to using nuclear energy with 100% conversion of mass to spatial energy, without nuclear radiation or radioactive isotope formation. Every system is thus an open thermodynamic system not in local thermodynamic equilibrium with respect to its interaction with time-energy flow, so that it moves through time. If **temporal** thermodynamic equilibrium is established with respect to a system's interaction with time-energy flow, the system will not "move through time". Even clocks and watches in such a system or in its near vicinity will not experience a movement through time, and this results in the ultimate "time dilation" in a way not previously recognized in physics. However, real experiments have demonstrated just such effects where clocks and watches inside a zone experienced no passage of time, while clocks and watches outside the zone experience time passage in a normal manner. An example is the reported experiments of Hurwich [47]. The present invention exploits such effects, and includes methods, systems and apparatus to deliberately create and engineer such effects and apply them to treat matter.

The treatment of a living body using a particular spacetime engine, such as to time-reverse cellular damage and disease, will be taught in **Figs. 27-29.**

Scalar potential interferometers can be configured to scan energy differences in an interference zone, including inside materials, to provide remote "seeing" and remote non-invasive interior imaging of any location within the entire interference zone. Adaptations include small devices to scan and inspect packages and luggage for shipment on vehicles, etc. for drugs, biological warfare agents, and other harmful substances, devices, or materials.

Vacuum engines and steered asymmetrical time-reversal of mass can produce desired elements and compounds by transmutation and transformation from any desired element or material. Thus, e.g., desert sand could be processed into, say, palladium for use in palladium-cladding of electrodes. Precious metals such as gold, silver, platinum, etc. could also be produced in this manner. Many complex chemical interactions could be enhanced and eased in this manner, and chemical interactions impossible in the conventional chemistry can be produced, as we detail in some of the embodiments of this invention, to be discussed later.

Time-reversal of the cells of the body can reverse the cellular effects of aging.

Scanning and bias-toggling interferometers can be used to both image and perform surgery on the interior of bodies. Such an embodiment uses the scalar interferometer first in a scanning mode to scan and localize an interior region needing surgical treatment, and second in an output mode to project desired conditioning into a precisely selected part of the body region scanned.

Another variation on the inventive concepts herein, not illustrated, is an embodiment for the treatment of diseases in mass populations at a distance. The sudden appearance of new and more virulent strains of influenza, e.g., could be treated in this manner and destroyed in the environment, long before ordinary vaccines could be obtained and distributed. Eventually the normal radiations of TV towers, radio towers, etc. can be conditioned, in the manner disclosed herein, to treat and cure specific diseases in mass populations. This would be of great utility in treating a populace struck by weapons of mass destruction such as anthrax, smallpox, or bubonic plague attacks on cities and their populaces. The populace could be immunized, the bioagent completely destroyed everywhere in the struck environment, and the city and populace completely decontaminated. No prior art in such areas presently exists.

PRIOR ART

With respect to the embodiments for electromagnetically treating living bodies, the closest known prior art is the work of Antoine Prioré, Robert O. Becker, and Fritz Alfred Popp. The following discussion analyzes their work and contrasts it with the present invention. No close prior art to the remaining aspects of the present invention is known, beyond the references previously cited herein.

1. The Work of Antoine Prioré

The closest known prior art is the magnetic-field treatment of living cells and bodies by Antoine Prioré in France in the 1950s through about 1973. Prioré's electromagnetic devices dramatically time-reversed diseased and damaged cells in laboratory animals. Christopher Bird [3] gives an overview of the Prioré affair and Jean-Michel Graille gives a complete account [4]. Technical results of Prioré's experiments are summarized in his unpublished doctoral thesis [5], which refers to additional papers in the French scientific literature reporting the team's results.

Photos of the machine utilized by Prioré to treat small animals previously grafted with fatal tumors, or infected with trypanosomes, etc. are reproduced in T. E. Bearden [9]. Graille [4] shows a photograph of the machine Prioré used to treat human subjects. Into a tube containing a plasma of mercury and neon gas, a pulsed 9.4 GHz wave modulated upon a 17 MHz carrier frequency was introduced. These waves were produced by radio emitters and magnetrons in the presence of a 1,000 gauss magnetic field. Experimental animals were placed into this magnetic field and the modulations passed through their bodies. In the 1960s, Prioré's machines demonstrated a nearly 100% cure of various kinds of terminal cancers and leukemias, in thousands of rigorous laboratory tests with animals. However, no scientists – including Prioré's own team – have yet explained how the treatment produced such astounding results under rigorous scientific protocols.

Despite the exorbitant radiation power consumed by Prioré's equipment, it required constant trial-and-error adjustment, since its radiations were inexact and he did not understand its underlying theory of operation. At best, by repeated experiments with novel combinations mixing some 17 EM waves in a tube filled with a rotating gas plasma, surrounded by a large coil

upon which a DC magnetic field was pulsed, Prioré speculated that he somehow "conditioned" the magnetic field in an unknown manner, and had no knowledge of the mechanism.

"Conditioning" is indeed an explanation, but was not further detailed by Prioré and his colleagues to explain why and how it can time-reverse living cells *in vivo*. Solely by trial and error, Prioré created one partial method of conditioning EM energy to treat matter, but never realized what was actually happening or how it was being accomplished. In hindsight, the present inventor has determined that Prioré combined the magnetic field with weakly-infolded multiple signals to unwittingly and partially produce a subset, or precursor, of an effect disclosed and exploited more fully in embodiments of the present invention.

Prioré obtained several patents upon his devices. See Antoine Prioré, "Procedure and Assemblage for Production of Radiation Especially Serviceable for the Treatment of Living Cells", French Patent No. 1,342,772 (Oct. 7, 1963) [6]; "Method of producing radiations for penetrating living cells," U.S. Patent 3,280,816 (Oct. 25, 1966) [6]; and "Apparatus for producing radiations penetrating living cells", U.S. Patent 3,368,155 (Feb. 6, 1968) [8]. With colleagues Prioré also published dozens of papers in the scientific literature. These are listed in his unpublished thesis [5], and by Bearden [10, 11].

However, because Prioré's infolding method was very limited, he had to use a very powerful magnetic field. Also, all of science at the time did not possess the theoretical mechanisms or knowledge to explain the effects so painstakingly produced by Prioré. It was impossible for Prioré or any other scientist, therefore, to provide any adequate explanation, and in fact it was impossible to go forward with development and implementation of his technology into the marketplace. Consequently, in the mid-70s the French government ceased funding and the project died. Prioré died in 1984 after two years debilitation. Shortly thereafter, in his doctoral thesis Eric Perisse published some results of experiments with the Prioré device [12].

Neither Prioré nor anyone else was aware of the crucial role of nonlinear optics in his invention. That field was unknown in the West prior to a Russian briefing to Lawrence Livermore National Laboratory scientists in 1972, and did not really take off until 1978-1980. The extant nonlinear optics dealt only with transverse EM waves. Its extension to

longitudinally-polarized and time-density waves is among the novel subject matter of the present invention.

There are numerous profound distinctions between Prioré's work and the present invention. Some of the more salient differences are set forth below.

Since Prioré did not truly understand the nature of his apparatus or how it produced its effects – his extraordinary and laudable efforts were trial-and-error – he could not produce a very good longitudinal wave. Thus the time-polarized accompanying wave was also weak and diffuse, requiring very long periods of irradiation (2-3 hours) to obtain only a mild, intermittent, and statistical time-charging effect, with the majority of the radiation being wasted or ineffective. The result was a very small degree of optical-level pumping. Prioré also had to adjust the machine for each case treated, and for every individual disease. In contrast, embodiments of the present invention may apply sophisticated recording, digital signal processing, amplification, and feedback of the signals emitted from the cells of the body (or other matter), and/or other methods unknown to Prioré, to generate a strong and precise time-reversal to directly engineer the microstate of the constituent cells, molecules, atoms, and subatomic particles. The present invention's precision, the short duration of its required treatment period, and its self-tuning for particular diseases or conditions, enables speedy and cost-effective treatment for, e.g., mass casualties of biological warfare and other large-scale disasters, as well as broad applicability in the public health domain. Prioré also painfully made his partial longitudinal waves and partially conditioned his fields and potentials *externally*. The present invention uses additional means of employing only ordinary EM waves externally, in special fashions that are aspects of this invention, to induce the formation and conditioning of fields and potentials in and by the body medium itself, including in the tiniest parts of all cells.

Furthermore, an embodiment of the present invention applies S. K. Lisitsyn's research [13] to selectively process some 11 specific frequencies, known to be key among all of the optical frequencies emitted by the body, plus several additional frequencies for applying the necessary signal conditioning (dynamics), thus improving the efficacy of the process. Prioré had no particular reason to prefer one combination of frequencies over another, other than trial-and-error experimentation.

Moreover, embodiments of the present invention improve substantially upon Prioré's apparatus, which was bulky (four stories high), expensive (millions of 1970 dollars), fragile (the giant plasma tube in the full-scale unit broke after only a few days at full-power operation), and consumed a great deal of power. By contrast, embodiments of the present invention may take the form of small, portable, inexpensive, durable treatment units that can be deployed when and as needed.

Because of the lack of responsible mechanisms and underlying theoretical basis, Prioré's results were not understood or disclosed in his patents or publications, and his method was not engineerable by others. Thus it could not be generalized to other kinds of apparatus, or applied to treating other kinds of matter, and it never suggested applying a selected delta other than a time-reversal to living matter. Prioré's work did not suggest or teach the methods, systems and apparatus of the present invention.

The novelty and non-obviousness of the present invention is underscored by the fact that it has taken the present inventor years of painstaking research since 1978 to uncover the mechanisms responsible and refine them into the engineerable systems taught herein.

2. The Work of Robert Becker

Another related piece of prior art that unwittingly obtained a weak time-reversal of living cells was shown by Robert Becker in his DC treatment of intractable bone fractures and in his regeneration experiments. For typical papers on his bone-healing work, see [14, 15, 16] and for typical references on his regeneration experiments, see [17, 18] and particularly [19, 20, 21].

Becker proved that cells could be dedifferentiated and redifferentiated with very weak (picoamperes) of DC current and weak voltages, but like Prioré he did not understand the mechanism or theory involved, as evidenced by his publications [e.g., 22]. Becker's publications do not in any way suggest that he knew longitudinal waves and time-polarized waves were responsible, nor that an extended form of optical pumping in the time-domain was involved, nor how the various apparatuses of the present invention could be constructed to produce the LWs, nor how the resulting LWs could be applied to condition and treat other kinds of matter, as disclosed herein.

3. The Work of Fritz Albert Popp

A somewhat related piece of art is the work in Germany by Fritz Albert Popp, who used quantum electrodynamics to show that cellular systems have some kind of master cellular control system, and that mitogenetic photon emission is correlated to cellular condition [24, 25, 26]. Again, the scientific knowledge at the time was insufficient for one skilled in the art to understand the mechanisms advanced in Popp's paper, and it has remained insufficient until the present invention. Popp's work showed that somehow cellular condition is related to electromagnetic emissions and suggested that further research was needed to determine the mechanism. Popp did not suggest, nor is it obvious to one skilled in the art, to use the observed emissions to cause specified changes in living cells, or in other kinds of matter, or by what mechanisms, as disclosed in the present invention. Furthermore, Popp never suggested that conditioned electromagnetic fields, waves, and potentials be deliberately created in order to induce desired changes in matter, or that the body itself could be induced to produce the engines doing the changing.

OBJECTS OF THE INVENTION

It is an object of the present invention to produce a longitudinal electromagnetic wave (along with its accompanying time-polarized electromagnetic wave) from transverse EM waves, and a conditioned time-density wave with deterministic substructure from longitudinal waves. Such waves may be utilized within other aspects of the present invention. The time-density wave may be a pseudo-longitudinal wave or a quantum potential of infinite velocity; methods and apparatus to produce it using a coil, plasma, multi-stage mixer, gas breakdown, 180-degree phase shift, phase-conjugate mirror, and digital-signal-processing means are provided. The conditioning may be produced by nonlinearly mixing predetermined transverse EM constituents controlled for phase, amplitude, and frequency.

A further object of the invention is to synthesize a conditioned scalar potential from its calculated mathematical constituents.

Yet another object of the invention is to amplify a phase conjugate replica wave so that a time-reversal zone or a vacuum anti-engine may be created. Such a wave may also be utilized in other aspects of the present invention.

A further object of the invention is to charge matter with a time-charge carrying a predetermined spacetime curvature set (an engine), and to produce specified changes in the matter by the operation of said curvature set and engine upon said matter, with emission of specified longitudinal EM waves during the excitation decay of the time-charge, and with the emitted longitudinal EM waves accompanied by associated time-polarized time-polarized wave companions which discharge the time-excitation charge, so that the emitted longitudinal waves and their accompanying time-polarized EM waves constitute ordinary, detectable transverse EM radiation from the body.

Another object of the invention is to produce predetermined conventional transverse EM waves in a target zone by interference of conditioned time-density waves, wherein energy can be added or removed from the target zone. Matter in the target zone can be time-charged with a deterministic spacetime curvature engine, and the engine applied to the matter through a process of excitation decay as described in the foregoing paragraph, to cause desired changes in the matter.

An additional object of the invention is to provide an instrument that can detect time-density charging and the initiation of time-charge excitation decay by calibrated interference from detected "ordinary" transverse EM wave radiation from a mass or body.

Yet another object of the invention is to propagate conditioned time-density waves by modulating them upon a standard carrier wave for conventional transmission. Transmission may be done by multiple antennas. Alternatively, by pre-mixing conditioned scalar potentials and transmitting them using a single antenna, a conditioned beam may be swept through a target zone and may contact targets at various distances to produce desired effects.

A further object of the invention is to transport, by means of conditioning applied to a time-density wave modulated upon a standard carrier wave, signals whose bandwidth exceeds the normal capacity of the transmission medium, and reconstitute those signals at a destination.

An additional object of the invention is to produce a time-reversal zone via iterative phase conjugation. The time-reversal zone may be enhanced by adding particles to the zone with predetermined absorption characteristics. The particles may be a colloid, a suspension, a material lattice, or an intensely scattering medium. Performance may also be enhanced by pumping the apparatus with EM waves, including time-polarized waves. Furthermore, chemicals and nuclear reactions may be selectively altered within the time-reversal zone to render harmful substances harmless, hasten their decay, or otherwise alter the substances. The apparatus may also be used to form deuterium nuclides and/or alpha particles.

Yet another object of the invention is to provide a system utilizing a conditioned scalar potential that may be used to decontaminate places or specimens that are contaminated with specified substances including disease-causing agents. The system may be a mobile system and the conditioning may be a predetermined spacetime curvature engine. Alternatively, the conditioning may be created on demand through analog or digital-signal-processing means after scanning the target zone with a biased scalar potential interferometer to determine what substances are present therein.

Degradation of harmful nuclear wastes into less-harmful or short-lived isotopes is another object of the invention. This may be done by induced quark-flipping in nucleons to transmit elements, or by inducing excess energy to speed up radioactive decay.

Moreover, an object of the invention is to time-reverse a living or inert mass to a state in which the mass previously existed, by producing an amplified vacuum anti-engine and applying the engine to the mass. Another object of the invention is to modify a mass to a state in which it may never have previously existed, by applying a delta vacuum anti-engine in addition to the time reversing anti-engine, providing "steering" of the resulting physical changes to the desired new state or physical condition, to what *would* have been a healthy state in the past had it existed. The delta anti-engine may be formed by nonlinearly mixing the vacuum engine comprising the mass's current state with the vacuum engine comprising a different mass-state.

Furthermore, an object of the invention is to provide a treatment unit to treat living cells and bodies to reverse disease and damage in them. A body is irradiated with longitudinal EM

waves (which are always accompanied by time-polarized EM waves) to form phase-conjugate replicas of EM signals from the body. The replicas are amplified and modulated upon a magnetic field to which the body is exposed, thus pumping the living cells and their constituent atomic and subatomic particles in the time-domain and time-reversing them. Another aspect provides a treatment unit to repair congenital and hereditary conditions by applying a determined delta anti-engine to the body.

A further object of the invention is to provide a portable treatment unit utilizing the aforesaid methodology for treating mass casualties.

A further object of the invention is to provide a larger treatment unit utilizing the aforesaid methodology for research and treatment within hospitals and other facilities.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a schematic depiction of the production of longitudinal EM waves from transverse EM waves, and time density waves from longitudinal EM waves.

Fig. 2 illustrates the time-charging of an electron to contrast a time-density-excited state used in the present invention with a conventional spatial-energy-excited state.

Fig. 3 shows the interference of time-density waves producing longitudinal EM waves, and the interference of longitudinal EM waves producing transverse EM waves.

Fig. 4A illustrates forming a time-density EM wave with a controlled substructure, by selecting and mixing constituent wave pairs, the constituent wave pairs being bidirectional phase-conjugate longitudinal EM waves, which may in turn be formed from constituent conventional transverse EM waves chosen from a harmonic series.

Fig. 4B illustrates a longitudinal EM wave pair given a difference frequency.

Fig. 5 is a flowchart illustrating a series of operations, according to embodiments of the present invention, that may be used to form a scalar potential with a deterministic substructure.

Fig. 6 is a flowchart illustrating operations, according to embodiments of the present invention, for creating conditioned pseudo longitudinal wave pairs and a conditioned scalar potential of infinite velocity, also known as a quantum potential.

Fig. 7 shows the production of conventional transverse EM waves in a target zone by interference of two time-density EM waves, which may be conditioned.

Fig. 8A is a schematic of an apparatus that may be used to condition a scalar potential using a coil.

Fig. 8B is a schematic of a different apparatus that may be used to condition a scalar potential using a plasma.

Fig. 9A is a schematic depicting an apparatus for multi-stage mixing that may be used to condition a scalar potential.

Fig. 9B is a schematic of yet another embodiment to produce a conditioned scalar potential using gas breakdown.

Fig. 9C is a diagram illustrating the nonlinear optics principle of self-targeting, and an enhanced method of exploiting them.

Fig. 10 illustrates an apparatus, according to one embodiment of the present invention, that may be used to convert transverse EM waves into longitudinal EM waves.

Fig. 11A is a diagram of an apparatus, according to a further embodiment, that may augment the present invention's wave conversion process.

Fig. 11B illustrates yet another method for creating a time-density wave.

Fig. 12 is a block diagram of a data processing system suitable for use as a controller in embodiments of the present invention.

Fig. 13 is a more detailed block diagram of a data processing system useful in embodiments of the present invention.

Fig. 14A is a block diagram of a codec for modulating a conditioned scalar potential upon a conventional sine wave carrier (carrier and its input to mixer not shown).

Fig. 14B is a block diagram of yet another embodiment for conditioning a scalar potential with an input signal and modulating it onto a sine-wave carrier for conventional transmission.

Fig. 15 is a block diagram of a system for interference of scalar potentials in a target zone using two transmitters and predetermined spacetime curvature engines.

Fig. 16 is a block diagram of a variant system for scalar potential interference using two transmitter systems and producing the spacetime curvature engines from transverse waves.

Fig. 17 depicts another scalar interference embodiment where a single transmitter may transmit two scalar potential beams by means of timed pulses.

Fig. 18 illustrates an embodiment that uses scalar interference to add or remove spatial energy from a distant target.

Fig. 19 shows an apparatus for altering chemicals by creating a time reversal zone within a reaction vessel.

Fig. 20 is a diagram of a mobile system that may be used to decontaminate buildings and similar structures via the interference of conditioned scalar potentials.

Fig. 21 is a flowchart showing steps of a process, according to embodiments of the present invention, to utilize a database of predetermined spacetime curvature engines in combination with interference between conditioned scalar potentials to act on a specified agent such as a disease-causing agent.

Fig. 22 depicts a mobile system that may be used, e.g., for biologically decontaminating a target zone, preferably utilizing a database of predetermined spacetime curvature engines, according to embodiments of this invention.

Fig. 23A is a block diagram of an interferometer system and apparatus, according to embodiments of the present invention, useful to alter the rate of a nuclear reaction, such as to induce quick α-decay in samples of otherwise longer-lived isotopes.

Fig. 23B is a diagram of an instrument to detect time-density charging and the initiation of time-charge excitation decay.

Fig. 24 illustrates a modified electrolysis apparatus using engineered time-reversal zones to form, e.g., deuterium nuclides and/or α particles.

Fig. 25A depicts an ordinary mirror versus a phase-conjugate mirror.

Fig. 25B shows the conventional method for creating an amplified phase-conjugate replica wave by pumping a nonlinear medium.

Fig. 26A depicts a time-reversal of a mass by an amplified vacuum anti-engine.

Fig. 26B depicts an application of the **Fig. 26A** process to alter a mass to a desired state that it never previously possessed.

Fig. 27 is a schematic of a portable treatment unit that may be used to treat a living body.

Fig. 28 is an illustration of the **Fig. 27** unit.

Fig. 29 is an illustration of a non-portable hospital and research embodiment of the portable apparatus shown in **Fig. 27** and **Fig. 28**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which illustrative embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

As will be appreciated by one of skill in the art, aspects of the present invention may be embodied as a method, data processing system, or computer program product. Accordingly, aspects of the present invention may take the form of an entirely hardware embodiment or an embodiment combining software and hardware aspects, all generally referred to herein as a "circuit" or "module" or “unit”. Furthermore, elements of the present invention may take the form of a computer program product on a computer-usable storage medium having computer-usable program code embodied in the medium. Any suitable computer readable medium may be utilized, including hard disks, CD-ROMs, optical storage devices, flash RAM, transmission media such as those supporting the Internet or an intranet, or magnetic storage devices.

Computer program code for carrying out operations of the present invention may be written in an object oriented programming language such as Java®, Smalltalk or C++, or in conventional procedural programming languages, such as the "C" programming language. The program code may execute entirely on the user's computer, partly on the user's computer, as a stand-alone software package, partly on the user’s computer and partly on a remote computer, or entirely on the remote computer. In the latter scenario, the remote computer may be connected to the user’s computer through a local area network (LAN) or a wide area network (WAN), or the connection may be made to an external computer (for example, through the Internet using an Internet Service Provider).

Aspects of the present invention are described with reference to flowchart illustrations and/or block diagrams of methods, apparatus (systems) and computer program products according to embodiments of the invention. It will be understood that each block of the flowchart illustrations and/or block diagrams, and combinations of blocks in the flowchart illustrations and/or block diagrams, can be implemented by computer program instructions. These computer program instructions may be provided to a processor of a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions, which execute via the processor of the computer or other programmable data processing apparatus, create means for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function/act specified in the flowchart and/or block diagram block or blocks.

The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks, and may operate alone or in conjunction with additional hardware apparatus described herein.

Various embodiments of the present invention will now be described with reference to the figures in which like numbers correspond to like references throughout.

Various forms of electromagnetic energy can be transduced (converted from one form to another) by successive phase conjugations, illustrating the principles of Whittaker [2]. These transductions are key elements that are used in various embodiments of the present invention and have been demonstrated empirically. Referring now to **Fig. 1, 100** shows a first phase conjugation and **110** shows a second phase conjugation taking the output of first phase **100** as its input. At **100,** a transverse electromagnetic (EM) wave **120** and its phase-conjugate replica wave **130** combine in mixing operation **140** to produce a spatially longitudinal wave **150.** At **110,** a longitudinal wave **150** and its phase-conjugate replica **170** combine at mixing operation **180** to yield a time-density wave **190** (depicted symbolically).

Fig. 25A depicts how a phase-conjugate mirror differs from a conventional mirror. A phase-conjugate mirror is a form of matter with unusual optical properties. In both diagrams there is a transverse EM radiation source **2500,** which could be an ordinary light bulb or other EM emitter, producing divergent radiation **120**. It is common knowledge that incident waves **120** from source **2500** impinge on an ordinary mirror **2505** and are reflected as reflected waves

2510 (which are also ordinary transverse electromagnetic waves similar to incident waves **120)**. In an ordinary mirror system **2505**, the angle of incidence equals the angle of reflection, about an axis of symmetry perpendicular to the mirror **2505**'s reflective surface. Thus waves **2510** continue to diverge after reflection from ordinary mirror **2505.**

By contrast, when divergent incident waves **120** impinge upon a phase-conjugate mirror **1010**, reflected waves **130** are not ordinary incident waves, but are exact time-reversed replicas of the incident waves **120.** Thus reflected waves **130** converge precisely back along the path taken by incident waves **120.** The energy in the waves **130** is time-reversed, which is observed instrumentally as parity reversal. Pumping phase-conjugate mirror **1010** with transverse EM pump waves **2520** may increase the magnitude of the phase-conjugate replica waves **130**. This amplification principle is exploited by various embodiments of the present invention. Note that the combining means **140, 180** of **Fig. 1** may be phase conjugation.

Fig. 2 schematically depicts a quantum-mechanical process by which an electron may become excited (i.e., charged) with energy, and subsequently emit the energy through a process of decay. A new kind of excited state – the **time-density charge** (time-energy charge) or **time-energy excitation** of a particle interacting with a longitudinal wave and thus with a time-density wave due to the automatic phase conjugating action of the particle – occurs upon charged particles. This kind of excited state is unknown to the prior art. This new type of excited state may alternatively be interpreted as an **electrogravitational charge** or **electrogravitational excitation**. Further, this new type of charge is internally structured (with a spacetime curvature engine or engines). So it can also be regarded as a **spacetime curvature engine charge**. Accordingly, matter can be activated (charged) in the new fashion so that, as the time-energy charges gradually decay by emitting longitudinal EM waves, those emitted waves in turn will induce desired actions upon and in any exposed mass irradiated by the LWs. This kind of activation (excitation) of deterministic spacetime-curvature engine charging of matter and subsequent emission of specific deterministic spacetime curvatures as longitudinal EM wave radiation patterns has not previously appeared in physics.

Now with reference to **Fig. 2**, atom **200** illustrates excitation with spatial transversely-polarized energy and atom **250** illustrates excitation with time-polarized energy. A nucleus of an

atom is depicted by **205**. Surrounding the nucleus are orbitals **210**, **215**, and **235**. Orbiting the nucleus is an electron **225.** When the electron is in a low-energy state it resides within a low-energy orbital **210.** An incident photon **230** carryies an increment of spatial EM energy, such as in transverse polarization. When photon **230** interacts with electron **225**, the electron absorbs spatial energy **220** and moves to a higher-energy orbital **235.** Subsequently (not shown here), spatial energy **220** will be emitted from excited electron **235** by an emission of a transverse-polarized photon, causing the electron to resume its former energy-level **225** in orbital **210**.

In atom **250,** when electron **225** is in a low-energy state it resides within a low-energy orbital **210,** which here indicates a low time-energy state. An incident photon **265** is carrying an increment of time energy, such as a time polarization. When photon **265** interacts with electron **225**, the electron absorbs time energy **260** and moves to a higher-time-energy orbital **255.** In this state electron **270** is said to be time-charged. Subsequently (not shown here), time energy **260** will be emitted from time-charged electron **270** by emitting a time-polarized photon **265,** or LW pairs equivalent to the same, causing the electron to resume its former position **225** in orbital **210**.

Fig. 3 shows at **300** that transverse EM waves can be produced from longitudinal waves through a process of interference. In the example, LWs **150** interfere in an interference zone **320**, and as a result transverse waves **120** are emitted. Similarly, at **350** longitudinal waves **150** are produced from time-density (scalar) waves **190** by interfering in interference zone **320.** These interference processes are used in several embodiments of the invention, for example when it is desired to transmit waves in one form to a distant site, then convert their energy back to an observable form, for example as shown in **Fig. 7**.

Thus, as illustrated in **Figs. 1-3**, if sufficient nonlinear interactions of multiple transverse waves take place, the phase conjugation of transverse EM waves can be utilized to create the present invention's internally structured longitudinal EM waves. Then the longitudinal waves can be utilized to create the present invention's internally structured time-density EM waves (conditioned scalar potentials). The time-density waves will induce time-density charging (excitation) of the interacting particles, after sufficient time has elapsed. The time-density charged particles will then emit transduced longitudinal EM waves as the excited time-energy

state decays. Subsequently some of these emitted LWs will also interact with available particles having spin, and be absorbed. In the re-emission, the excited particles will emit both longitudinal and transverse EM waves (the latter due to particle spin).

The key to producing higher-order (i.e. longitudinal) EM waves is to maximize certain nonlinearities in the system. Desirable nonlinearities are those that cause phase-conjugation within a particular system, which may be a function of the frequencies present in that system. Stable iterative phase conjugation gradually produces a complex of higher-order EM waves. Stable interactions of these higher-order EM waves with particles having spin gradually induces the formation of "anomalous" transverse EM waves at the end of the process for decay of the induced time-charge excited states.

Fig. 4A depicts a scalar potential (time-polarized electromagnetic wave) Φ (phi) **400** as being composed from members of a harmonic series of component longitudinal wave pairs **150, 170**. It will be understood by one skilled in the art, per iterative Whittaker transformations [2], that the LW pairs themselves may be considered to be composed of transverse EM waves. By definition, the frequencies of members of a harmonic series are related by each being some integer multiple of a fundamental frequency. The figure shows a graph where x-axis **420** represents distance and y-axis **410** indicates velocity. Each wave pair consists of two spatially-polarized longitudinal waves, time-forward wave **150** and its counterpart phase-conjugate replica wave **170** (which may be thought of as being time-reversed). In each wave pair, the two waves superpose spatially, but travel in opposite directions. Thus each pair comprises a longitudinal wave and its corresponding anti-wave, coupled, through an application of nonlinear optics' distortion correction theorem in which individual photons couple in photon-antiphoton pairs. (Since a photon-antiphoton pair has spin 2, the pair is also known as a graviton; a phase-conjugate pair of any of longitudinal waves **430-470** may also be considered an electrogravitational standing wave.) Velocity modulation is a property of longitudinal waves. The space-energy-density carried by such a wave is not oscillating; rather, its time-energy-density is oscillating.

The wave pairs **430-470** shown in **Fig. 4A** differ in frequency and instantaneous velocity. So the wave pair with average velocity **430** is the fundamental and has a frequency of 1 on the

graph. The wave pair with velocity **440** has a frequency of 2 over the same spatial interval; thus **440** is the second harmonic of wave pair **430.** Similarly wave pair **450** is the third harmonic and wave pair **470** is the fourth harmonic, making the four exemplary wave pairs members of a harmonic series. According to the invention, as will be explained with reference to **Fig. 5,** one can construct a scalar potential **400** with deterministic substructuring by adroitly (1) selecting a particular collection (i.e., spectral content) of component longitudinal waves – or equivalently selecting their precursor transverse waves; (2) controlling the waves for frequency, phase angle, and magnitude; and (3) superposing or mixing them. While not shown in the **Fig. 4A** example, in selecting components from which to form conditioned scalar potential **400** in accordance with embodiments of the present invention, some members of a harmonic series may be omitted (or, equivalently, their magnitude set to zero). Any modification of the basic internal waves in **Fig. 4A** constitutes an **engine** (spacetime curvature engine, vacuum engine).

Fig. **4B** illustrates longitudinal EM wave pair production by means of a difference frequency, another principle exploited by embodiments of the present invention. Two specific input frequencies **475** and **485**, which may be transverse EM waves, are input into a nonlinear medium **490**. Medium **490** may be any suitable nonlinear medium as described herein, or other medium capable of mixing input waves by superposition, and is preferably isomorphic. After mixing within medium **490**, input waves **475, 485** pass through transverse wave filter **492,** which is a filter capable of selectively blocking transverse waves. For example, at electrical frequencies, filter **492** can be a combination of band-pass filters, tank circuits, or other circuits resonant at given frequencies, configured such that no transverse wave frequencies are able to pass through the series of filters. Although input frequency **480** is not physically present as an input, a result of apparatus **490, 492** is to perform operations upon input frequencies **475, 485,** for example by means of superposition and mixing, such that difference frequency **480**, also called a "beat frequency", is selected. The stress produced by the intermixing (**480**) and blocking (**492**) of input waves **475, 485** removes the transverse energy components (i.e. components arising from electron precession) from the difference frequency **480**, leaving only the more fundamental longitudinal components. Since a transverse wave **480** is mathematically and physically equivalent to a bidirectional longitudinal EM standing wave pair, i.e. a wave plus its phase-conjugate replica, per Whittaker [2], then what is emitted from filter **492** is a

bidirectional phase conjugate longitudinal EM wave pair **495** at the difference frequency. The method of **Fig. 4B** may be exploited in various embodiments of the present invention whenever it is desired to produce a bidirectional phase conjugate longitudinal EM wave pair of a given frequency.

Fig. 5 is a flowchart illustrating a process **505** for a series of operations, according to embodiments of the present invention, that may be used to form a scalar potential with a deterministic substructure (i.e., a conditioned time-polarized wave). At step **500,** particular constituent transverse waves are selected comprising particular spectral content. At step **510** the constituents are controlled as to frequency, magnitude, and phase angle. At step **520** the transverse wave components **120** interact with a nonlinear medium, producing phase-conjugate replicas **130**. This combining operation **140** at step **530** yields longitudinal waves **150**. The production and combining operations are preferably done using an embodiment of the present invention, such as exemplary apparatus **1000, 1100**. At step **535,** the longitudinal waves **150** interact further with the nonlinear medium in combining operation **180**, producing phase-conjugate replicas **170** of longitudinal waves **150** (e.g., exemplary wave pairs **430-470**). At step **540,** conditioned scalar potential **400** with a deterministic substructure has been produced, and may be further utilized in other aspects and embodiments, concluding the **Fig. 5** process.

Fig. 6 is a flowchart illustrating operations, according to embodiments of the present invention, for creating conditioned pseudo longitudinal wave pairs **430-470** and a conditioned scalar potential of infinite velocity **400**, also known as a quantum potential. The process of **Fig. 6** is preferably implemented by means of an embodiment of the present invention such as apparatus **1000, 1100** depicted in **Figs. 10-11**. At step **600**, constituent transverse waves **120** are selected and individually controlled as to frequency, phase angle, and magnitude. Waves **120** are then introduced between phase-conjugating mirrors **1010**, which may be components of, e.g., apparatus **1000.** In step **620**, the mirrors perform nonlinear optics phase conjugation upon the input transverse waves, yielding transverse phase-conjugate replicas **130**. At step **630,** waves **120-130** interact between the mirrors, such that the traverse component decreases and the spatially-longitudinal component increases. If at step **640** the longitudinal component is not predominant, phase conjugation of the transverse wave inputs continues at step **620**. Otherwise, if the longitudinal component has become predominant at step **640**, block **650** indicates that

pseudo longitudinal wave pairs with a velocity between zero and infinity have been created, such as wave pairs **430-470**. If it was desired to produce only pseudo longitudinal wave pairs, the process may terminate at block **650**.

If, however, the production of a conditioned quantum potential (a quantum potential being a pure time-polarized wave with no spatially-transverse residues) is desired, further phase conjugation of the pseudo longitudinal wave pairs **430-470** may be undertaken at step **660** by introducing the longitudinal wave pairs **430-470** between phase-conjugating mirrors, which may be phase-conjugating mirrors **1010**. A second-order convergence process ensues (step **670)**. By second-order it is meant that the interacting waves are not those first introduced at step **600**, but byproducts of their interaction. During step **670** the transverse component further decreases and the velocity of the longitudinal wave component increases (step **680**). If at step **690** the velocity of the resulting waves is not yet infinite (finite velocity being an indication that vestiges of spatial polarization remain), the second-order convergence process of step **670** continues. If however at step **690** the resulting waves' velocity is now infinite (indicating that all transverse polarization has been converted to longitudinal polarization and the resulting wave is a pure bidirectional longitudinal wave pair with infinite velocity – consisting only of oscillations in the density of time-energy), the process ends at step **695**. The resulting quantum potential **400** has now been produced and conditioned with the selected constituents **120** and **430-470**.

It will be apparent to one skilled in the art that steps **620-650** and steps **660-695** can be performed in two separate stages, or concurrently within a single apparatus, or a mix of separately and concurrently. The output **400,** or any of the intermediate wave forms **120**, **130, 150, 160, 430-470,** may be recorded on any suitable recording media capable of recording electromagnetic fields, potentials, or waves, or combinations thereof. They may also be digitized, and the recordings or the digital representations stored, via a data processing system such as that to be described with reference to **Figs. 12-13**, for playback at a future time. It will also be apparent to one skilled in the art that such recordings may be introduced into the **Fig. 6** process, or other embodiments of the present invention, at one or more appropriate stages, in order to deterministically alter the mixture of interacting fields, potentials and waves, and thereby alter the conditioning of the resulting scalar potential. Furthermore, the recordings or digital representations may be transmitted to other locations in the same manner as conventional

analog recordings and digital data are conventionally transmitted, for example by being modulated onto a sine-wave carrier such as a radio signal, or using a network such the Internet or any other suitable network capable of transporting data. Moreover, the recordings and digital representations may be transformed numerically using a conventional numerical data processor or digital signal processor to perform operations such as phase conjugation, addition, inversion, computation of a difference frequency, and so forth, before conversion back to analog form or other use within an embodiment of the present invention.

Fig. 7 illustrates the production of conventional transverse EM waves **120, 130** and/or longitudinal EM waves **150, 170** in a target zone **320**. Longitudinal EM waves **150**, **170** are shown being produced. Interferometer receivers are familiar in the field of astronomy, where the signals from multiple radio telescopes may be combined into a single more detailed image, through precise timing to reconstruct the signal as if received by a single instrument of larger aperture. An embodiment of the present invention shown in **Fig. 7** uses interferometry in a transmission mode.

In concept, a desired set of spacetime curvature forces and patterns is selected that is adapted to perform precise desired actions in a target mass. The set is calculated and transformed into at least two conditioned scalar potential functions. Each scalar potential function is then emitted by a respective transmitter of a scalar potential interferometer as a scalar potential function beam. Where the transmitted beams intersect in an interference zone, the desired forces and potential gradients arise within the quantum-mechanical active vacuum (also called the spacetime potential) of that zone. As a result, time-charging occurs and the local spacetime potential in the zone becomes structured with the desired spacetime curvature forces and patterns. The forces and patterns (also called spacetime curvature engines) arise from every point within masses present in the zone during the period of time-charge excitation decay within the zone, and do not propagate in the manner of conventional force fields through the space intervening between the transmitters and the interference zone. As shown by general relativity, spacetime curvatures do act on any mass in the spacetime where they exist. Hence the formed spacetime curvature engines do act on the exposed mass in the interference zone, to accomplish the desired purpose.

Referring specifically now to **Fig. 7,** transmitters **710** are two transmitters capable of transmitting time-polarized waves **190**. The transmitters are preferably Whittaker/Ziolkowski [34] transmitter arrays capable of transmitting 8 to 20 harmonic wave pairs each. In this example, each transmitter **710** transmits a conditioned scalar potential beam **400**. As a result of the prior selection of constituent transverse waves **120,** resulting in the creation of constituent longitudinal waves **150, 170**, **430-470** as previously explained with reference to **Figs. 5** and **6**, scalar potential beams **400** may be conditioned, i.e. carrying hidden bidirectional electromagnetic energy flows **720**. These energy flows **720** are "hidden" in the sense that the energy they are carrying is present in the form of time-polarized and longitudinally-polarized energy, but as a result of the conditioning process **505, 605,** the transverse polarization components (steps **630, 680**) have cancelled each other out, leaving no detectable transversely-polarized spatial energy residues. "Hidden" simply means the energy is not detectable with conventional instruments adapted solely for detecting transverse electromagnetic energy. The "hidden" component may of course be detected with specialized instruments that are adapted for detecting such energy in which the active principle may be a plasma, ionization, interference, and so forth. Where scalar beams **400** intersect in an interference zone **320,** they interfere (i.e., superpose nonlinearly). Peaks combine with peaks, resulting in higher amplitude; troughs add to troughs resulting in lower amplitude. Since after this addition the time-forward wave constituents and their phase-conjugate replicas are no longer perfectly matched as to phase and amplitude – a required condition for the transverse polarization components to have been suppressed – the "hidden" energy components become manifest as detectable conventional transversely-polarized electromagnetic fields, waves, and potentials. This results in the immediate emission of spatially longitudinally-polarized waves **150, 170** (and equivalently, transversely-polarized waves **120, 130,** per Whittaker [2]) in interference zone **320**. The resulting emissions or potential gradients may be positive (i.e., adding spatial energy to the target zone), negative (i.e. removing energy from the target zone), or fixed (constant). These processes may be further exploited in other embodiments herein.

In addition, some photons **265** in a scalar potential beam **190** carrying increments of time-energy **260** may be absorbed by some electrons **225** in a target zone of scalar potential beam **190**, moving to higher time-energy levels **270**. (This phenomenon does not require

multiple scalar potential beams.) Thus, matter within a target zone of a scalar potential beam may become time-charged. The degree of time-charging depends on the magnitude of the scalar beam **190** and the duration of exposure. As time-energy **260** is emitted from time-charged target-zone electrons **270**, time-polarized photons **265** – or their equivalent spatially polarized equivalents – are emitted. This process of decay, of matter in the target zone, from a time-charged state to a non-time-charged state, occurs gradually after the presence of the scalar potential energy **190** within a target zone. The deferred emission of time-polarized photons in the target zone may interact with other energy in said zone, causing additional deferred interference phenomena. Various embodiments of the present invention, to be described, will make use of this time-charging phenomenon to alter and treat matter long after the scalar beam in the target zone ceases.

In an alternate embodiment for **Fig. 7**, a scalar potential may be calculated mathematically and synthesized from its calculated constituents. In this embodiment a selected scalar potential function is solved mathematically for its transverse wave constituents. The constituents are then assembled and phase conjugated, and then the resulting longitudinal waves also assembled and phase conjugated, yielding the desired scalar potential function. This process is also used to calculate and include internal structural deviations in the internal waves, thus infolding **specific engines** in the scalar potential functions.

To reiterate this process in more detail, the required scalar potential functions are first calculated then mathematically decomposed into a set of bidirectional longitudinal EM wave pairs. Each longitudinal EM wave in the set is then further mathematically decomposed into the phase conjugation of a given transverse EM wave. Each calculated transverse wave is generated (e.g. using an analog wave generator or a digital signal processor) and individually phase conjugated, forming a first set of longitudinal EM waves. Each LW in the first set is then individually phase conjugated, thereby producing a second set, being a set of bidirectional longitudinal EM phase conjugate wave pairs. This second set constitutes the selected conditioned scalar potential. The second set **400** may be transmitted by the transmitters **710** of the scalar potential interferometer into an interference zone **320**, as previously described.

Fig. **8A** is a schematic of a simple embodiment that may be used to condition a scalar potential. By way of explanation, when potentials superpose, their composite longitudinal wave pairs also superpose. So pulsing a DC signal upon a coil carrying transverse wave frequencies can fuse the constituent LW substructures of all potentials that are present on the coil. When the pulse is removed, waves leaving the coil have been conditioned to transport the desired longitudinal wave pair pattern that was introduced via the DC potential. This method may be used to condition signals in a coil on a continual basis. Apparatus **800** is powered by power source **810**, which is preferably a DC potential. A first terminal of power source **810** is grounded and a second terminal is operably connected to switch **820**, which may be any suitable switch such as a single-pole single-throw switch or momentary contact switch or oscillator-controlled switch. A first terminal of a coil **830** is operably connected to switch **820** and a second terminal of coil **830** is grounded. When switch **820** is closed, the potential from power source **810** appears across coil **830.** Waveform **825** (a square wave) indicates that due to the on-off action of the switch, the potential appearing on coil **830** has very sharp rise and decay times (i.e., a value of *dq/dt* approximating 0). Input transverse waves that are desired to be altered into a mixture of longitudinal electromagnetic bidirectional phase-conjugate pairs **430-470** are introduced by means of pulse **825**. Thus the input waves are mostly electrostatic wave oscillations, when measured across coil **830**. Coil **830** and band-pass filter **835** are operatively coupled to one another by radiation, not conduction. Filter **835** is adapted to pass only the frequency desired. The output **840** of filter **835** is a longitudinal bidirectional electromagnetic standing wave that may be used, e.g., in other aspects of the present invention.

Yet another embodiment for creating a conditioned scalar potential uses staged mixing. In this embodiment a first set of previously-conditioned signals are introduced onto a coil; these currents and voltages are allowed to build up and oscillate in the coil until they become stable (i.e., standing waves form). A second signal, which is a pulsed DC signal, is then introduced onto the coil. Again internal longitudinal wave pair structures superpose and mix. The pulsed DC signal leaving the coil is a conditioned pulsed DC carrier carrying a desired internal structure from the first set of signals.

Referring now to **Fig. 8B,** apparatus **850** is powered by a DC source potential **855.** A multiplicity of input transverse waves **120**, which may be selected according to the process of

Fig. 4A, are introduced into the apparatus **850** from a multiply-structured frequency source **865.** Source **865** may be a conventional signal generator, digital signal processor, or other means of producing a multiplicity of sine-wave signals, and is preferably capable of controlling the frequency, phase angle, and magnitude of the signals. A first terminal of coil **875** is operably coupled to a negative terminal of power source **855**, and an opposite terminal of coil **875** is operably coupled to a pulse controller **860**. The pulse controller **860** receives power from power source **855**, is operatively attached to frequency source **865**, and is adapted to control the frequency source **865** by conventional means so that the outputs of source **865** may be pulsed on and off at predetermined intervals. Mixing is performed within coil/plasma apparatus **870-875**. Coil **870** may be a conventional coil comprising a multiplicity of turns of a suitably-gauged conductor encircling a non-conductive cylindrical core. Within coil **870** is an enclosure or tube containing a confined gas, which is preferably a noble gas or mixture thereof, but may be other gas suited for performing the present invention's mixing functions at one or more desired frequencies. Each individual transverse wave frequency from source **865** is directed to a respective electrode in tube **870**. Two additional taps at opposing terminals of coil **870** are operably attached to the respective terminals of intermixed output stage **840**.

By way of further explanation, the plasma in tube **875** converts fractions of the input transverse waves **120-150** – which may be considered as energy-density oscillations in 3-space – into longitudinal electromagnetic waves **430-470 –** which may be considered as energy-density oscillations of time-energy, having a fixed spatial-energy density. The pulsed DC on coil **870** can be decomposed into two scalar potential functions, per Whittaker [2]. Thus the longitudinal wave components **430-470** created in the gas **875** comprise a scalar potential **190**. Since it is well known that potentials superpose, the mixing of the scalar potential functions **190** results in the infolding of the longitudinal EM waves **430-470** and their dynamics into the resulting scalar potential **190**. Such infolding is also called *conditioning* or *dimensioning*. The intermixed output **840**, which is a conditioned scalar potential **400**, may then be used, e.g., in other aspects of the present invention.

Fig. **9A** is a schematic depicting yet another apparatus that may be used to condition a scalar potential. A plasma or gas-filled tube is placed inside a coil – preferably a toroid – and desired structuring frequencies introduced into the gas or plasma as conventional transverse EM

waves. The outputs of several such pre-mixers can then be fed to a subsequent mixer. **Fig. 9A** shows such an array for multi-staged mixing of internal electrodynamic structures. Apparatus **900** is a variant on apparatus **850** in which conversions of a multiplicity of input transverse waves into longitudinal waves are performed by a multiplicity of pre-mixer stages (**928…934)** operating in parallel, and the resulting LWs (**440…470)** are subsequently mixed in a mixer **945.** Each premixer stage **928…934** of apparatus **900** is powered by a power supply **855**, and has a pulse controller **860** and a multiply-structured frequency source **865** as previously described with reference to **Fig. 8B.** Instead of a cylindrical coil containing a gas-filled enclosure, each premixer stage has its own toroidal coil **925** which is preferably a conventional toroid consisting of a multiplicity of turns of a suitable conductor wound on a doughnut-shaped non-conductive core. The physical arrangement of the multiplicity of premixer stages **928…934** is such that each toroid **925…925** lies at the circumference and surrounds a preferably-cylindrical enclosure **920** filled with a gas such as a noble gas or mixture thereof, and the same gas-filled enclosure passes through the center of the toroid **925** of each premixing stage **928…934**. At each premixer stage **928…934,** the multiple transverse wave inputs from frequency source **865…865** are introduced into that stage's respective toroid **925…925.** A tap on an individual toroid **925** collects the conditioned output **940** of an individual premixer stage. Each of a multiplicity of outputs **940...940** is operably attached to a multi-stage mixer **945**, which combines the same to yield output **948.**

Fig. **9B** is a schematic of a further embodiment to produce a conditioned scalar potential, in this case using overpotential and ionization breakdown in a gas. By way of overview, in apparatus **950**, a first set of conditioning waves and frequencies are mixed into a gas, so that the voltage of the first set is in the gas's overpotential voltage region but below the gas's initial ionization breakdown voltage. At the same time, a second potential, which is a DC potential, is placed upon the gas in the overpotential voltage range, but again shy of voltage breakdown of the gas. Thus, in a gas characterized by a charge-blocking of breakdown discharge current, a potential may be used as an overpotential. In this fashion the internal structures of the first and second set of potentials mix and fuse. All the introduced frequencies – each considered as just two potentials per Whittaker [2] – will diffuse and infold all their longitudinal wave pair structuring – and thus *themselves*, since they are just the sum total of their substructures – into

the overpotential, conditioning the overpotential as desired. Addition of another voltage pulse sufficient to induce initial breakdown and discharge of the overpotential will then result in an emitted pulse containing the desired conditioning of its potential. The apparatus conditions both the E-field and B-field of the emitted signal. Components **860, 865, 870, 875,** and **840** of apparatus **950** are similar to those described with reference to previous figures. Instead of a single DC source, the apparatus **950** has two DC sources whose voltage is chosen with respect to the ionization breakdown voltage for a selected gas within enclosure **875**. The voltage of a first DC source **955** is below said breakdown voltage and the voltage of a second DC source **960** is above said breakdown voltage. The positive terminal of source **955** is operably connected to a positive input terminal of coil **870**, which in turn is also operably coupled with pulse controller **860**, and provides a steady-state potential. The positive terminal of source **960** is operably attached to provide an input to pulse controller **860**. The pulse controller **860** periodically allows the overpotential from DC source **960** to overpotentialize the plasma **875,** causing an ionization breakdown**.** This causes a mixing of the internal electrodynamic structures of the multiple potentials and fields. The negative terminals of both sources **955, 960** are operably connected to a negative input terminal of coil **870,** and taps on coil **870** are adapted so as to pass the output of the mixing process to intermixed output **840**.

Fig. **9C** is a diagram illustrating the nonlinear optics principle of self-targeting. It explains how iterative retroreflection of an input wave between phase conjugate mirrors can convert the input wave from a pseudo longitudinal wave pair into a perfect longitudinal wave pair. An iterative phase conjugate reflection process gradually reduces the transverse component of a transverse EM wave to zero, while simultaneously transferring the oscillation energy to the time-domain.

First, it should be understood that when a pseudo-LW pair is phase conjugated, perfect phase-conjugate replicas are added to both the forward-time pseudo-LW portion and the reversed-time pseudo-LW portion. This converts the pseudo-LW pair into two "perfect" LW pairs slightly dephased from each other. That is the deeper mechanism involved in the simpler notion of adding a phase-conjugate replica to a transverse EM wave, to obtain a true LW pair. In fact, one obtains two perfect LW pairs, coupled but slightly out of phase. The dephasing is a little-known result of the well-known slight spatial separation between an atomic nucleus and its

electron cloud, the time-forward components being emitted by photon interactions with electrons and the time-reversed components being emitted by anti-photon interactions with protons. Now, a proper analysis must take this slight dephasing into consideration because it produces a difference frequency that is primarily responsible for converting an input wave to a pure longitudinal wave.

Fig. 9C graphically depicts the gradual diminution of transverse components' magnitude over time during a process of iterated retroreflection, shown in steps **970, 975** and **980** which represent a time 1, a time 2, and a time 3. Referring now to time 1 **(**step **970),** consider two phase conjugate mirrors **1010** facing each other and separated by a homogeneous nonlinear medium (omitted for clarity), with iterated retroreflection throughout the medium of a set of waves **981-982** between the mirrors. The mirrors **1010** may be, for example, colloidal particles in suspension, or other suitable phase-conjugate mirror materials. As is known in the art (see, e.g., Flynn [45]), in any homogeneous *nonlinear* medium, a difference between two sine waves acts as if it were a normal wave being transmitted through a *linear* medium. However, the phase conjugation of pseudo longitudinal wave pairs to produce pure longitudinal wave pairs is unknown in the prior art. Thus, according to the present invention, as iterative phase conjugation, also called self-targeting, continues between the mirrors **1010**, this action of the virtual difference frequency increases. The difference frequency acts as a wave input at both retroreflection endpoints **1010.** At time 2 (step **975),** the two real transverse waves **981-982** bounding the virtual difference wave now begin to act as pump waves in each mirror, increasing the amplitude of the virtual difference retroreflections. The result is a transfer of energy from the bounding transverse waves **981-982** into the growing virtual difference wave. At time 3 (step **980)**, the virtual difference wave itself (not illustrated) has been phase conjugated perfectly and become a perfect virtual longitudinal wave pair, illustrated symbolically by arrows **982-982** and **981-981** representing time-density waves. In addition, in the presence of noise in the medium, the energy from the noise can be transferred or partially transferred to the difference frequency, amplifying it [46].

By way of further explanation, the transfer of energy to the virtual difference wave is simply the transfer of energy to a virtual entity, and therefore it constitutes a broken symmetry. By the definition of broken symmetry, something virtual must become observable. In this case,

the virtual entity (the difference wave) to which the energy is transferred becomes observable *a priori* via the broken symmetry. The virtual difference frequency becomes a real standing longitudinal bidirectional wave pair, and rapidly assumes all the energy of the original transverse pump waves. In short, two input frequencies have now been converted into their difference frequency, where that difference frequency wave is a pure longitudinal EM wave pair having infinite velocity and infinite energy.

The phase conjugation of pseudo-LW pairs, the production of a LW as the difference frequency between two transverse input waves, and the amplification of the difference frequency by the introduction of noise – all disclosed in the embodiment of **Fig. 9C –** may be exploited in other aspects of the present invention.

Fig. 10 is a diagram of an apparatus **1000**, according to an embodiment of the present invention, for creating a time-reversal zone by a process of phase-conjugation. The apparatus may be used to carry out the processes described in **Figs. 5-6** and may be used in conjunction with other embodiments described herein. In concept, iterative phase conjugation between separated but facing phase conjugate mirrors will produce a time-reversed zone in a space between the mirrors when the magnitude of the phase conjugate (time-reversed) wave energy in the space exceeds the total time-forward wave energy in the space. This can be achieved by adjusting the number of mirrors, the energy of pump waves, and the bandwidth of frequencies within the space.

Referring now to **Fig. 10,** the apparatus **1000** contains at least two phase-conjugate mirrors **1010** made of suitable materials, with suitable placement, spacing, and dimensions, according to the principles of nonlinear optics, to create phase-conjugate replicas **170** of input signals **150** (longitudinal wave **150** may be considered equivalent to transverse wave inputs **120,** per Whittaker [2]). Protons **1020** may be used to enhance the effect. Input waves **150,** preferably chosen as previously described with reference to **Fig. 4A,** are introduced between mirrors **1010**. The phase-conjugate replicas **170** precisely retrace the spatial path of their input counterparts **150.** Bouncing back and forth through an iterative phase-conjugation "ping-ponging" process **1040**, standing waves form, transversely polarized components of the input waves **120** cancel each other out, and longitudinally polarized components reinforce one another

and increase in magnitude. The area **800** of ping-ponging **1040** then becomes a time-reversal zone when the magnitudes of the longitudinally-polarized components exceeds the magnitude of the transverse components. The phase conjugation and time-reversal effects may be enhanced, and the resultants amplified, through the optional injection of pump waves **1030,** which are preferably injected at phase-conjugate mirrors **1010**. Transversely or longitudinally polarized waves can be used as pump waves **1030,** but wide-bandwidth longitudinal EM waves are preferred to enhance the effect.

The efficiency or tuning of apparatus **1000** may be altered by placing various materials between mirrors **1010,** i.e., into the location for time-reversal zone **800**. For example, particles **1040,** preferably a colloidal suspension of active particles resonant with a resonant frequency of the input waves **150**, may increase the ping-pong between the phase-conjugate mirrors **1010**. The formation of the time-reversal zone can be enhanced by increasing the energy absorbed upon each particle, e.g. by sizing the particles so that they are resonant, or nearly resonant, with a frequency of the absorbed radiation. Such particles may absorb and re-emit (including as phase conjugate emissions) more energy than they receive. See Bohren [48], Paul and Fischer [49] and Letokhov [50]. This asymmetrical self-regauging raises the energy density of the entire particle suspension, as well as the energy in the phase conjugate reflections. Mixtures of colloids may be used with a mix of input frequencies. Suspensions of larger particles or regular masses can be utilized if the liquid medium is agitated to keep the particles **1040** in suspension. The material may be an intensely scattering medium **1050,** preferably resonant to some of the frequencies **430-470, 1030** and subharmonically resonant to some of the others. Alternatively, the material may be a lattice or array **1060** of material mixes in solid suspension or in liquid suspensions to enhance the production of longitudinal wave pairs. In yet another embodiment, the material may be a solution of molecules chosen for their frequency ranges determined from their chemical resonance and anti-Stokes emission characteristics. In an alternate embodiment, an inert gas mixture can be utilized instead of a resonant particle suspension and the gas irradiated with transverse EM waves whose frequency is resonant or near resonant with the gas particles. If subharmonic oscillation is used with an inert gas, a delay will ensue before the gas particles go into stable resonance. It will be apparent to one skilled in the art that the materials placed between mirrors **1010** and/or within time-reversal zone **800** may be varied in order to produce

particular effects, without departing from the spirit and scope of the present invention, and the above materials are by way of example and not of limitation.

Fig. 11A depicts an alternative embodiment **1100** that may improve upon the efficiency of apparatus **1000** by pumping the time-reversal zone **800** with time-density waves **190**. This may be done using a time-density wave generator **1110,** which may be any suitable time-density wave generator, including but not limited to an embodiment of the present invention. For example, the output of apparatus **1000** may be introduced into apparatus **1100.** Other methods of obtaining time-density waves may be employed, and the above example is not intended to in any way to limit the scope of what is claimed. By time-charging matter in the time-reversal zone **800**, this method **1100** may enhance the production of longitudinal EM waves and consequently provide an improved time-reversal zone and improved production of a conditioned scalar potential for treating matter.

Fig. 11B is a block diagram of yet another method for creating time-density waves. An input transverse wave **120** enters a wave splitter **1120,** which can be an ordinary wave splitter of a type well known in the art. The function of the splitter **1120** is to pass a first portion of the input wave **120** unchanged to a phase-shifter **1130,** and a second portion unchanged to a nonlinear mixing modulator **1140**, to both of which it is operably attached. The phase shifter **1130** is a 180˚ phase shifter which may be a commonplace RC circuit, a delay line, a digital signal processor of sufficient resolution, and so forth. The function of the shifter is to emit an output wave that is 180˚ out of phase from the input wave, resulting in an output wave **1135** whose phase angle is inverted with respect to the phase angle of input wave **120.** The shifted output wave is passed to modulator **1140,** which combines the first portion with its 180˚-phase-shifted counterpart transverse wave **1135**. The modulator **1140** may be any suitable nonlinear medium, such as a plasma, capable of mixing the input waves by superposition. The output from the modulator **1140** is a time-density wave **190.**

The method of **Fig. 11B** may be used in various embodiments of the present invention whenever it is desired to create a time-density wave. It will be apparent to one skilled in the art that the elements of **Fig. 11B** can utilized in multiple stages and in various combinations, such that a multiplicity of input waves **120** may be combined to yield time-density waves **190.** In

such a multiple-stage embodiment the mixing and combination may yield a conditioned scalar potential **400** wherein said conditioning is a function of the selection of the input waves.

Fig. 12 illustrates an exemplary embodiment of a data processing system **1200** suitable for use as a controller, such as controller **1200** in **Figs. 15-20** and **Fig. 22-23,** in accordance with embodiments of the present invention. The data processing system **1200** typically includes a memory **1236** that communicates with a processor **1238.** The data processing system **1200** may optionally include input device(s) **1232** such as a keyboard or keypad, and output devices such as a display **1230** that also communicates with processor **1238**. The data processing system **1200** may further include optional devices such as an audio device **1244**, mass storage devices **1248** such as disk drives, tape drives, CD-ROM drives, and so forth, and I/O port(s) **1246** that also communicate with processor **1238**. The I/O ports **1246** can be used to transfer information between the data processing system **1200** and other computer systems, networks, data acquisition units, transmitters, receivers, phase conjugators, time-density wave generators, longitudinal wave generators, and other analog and digital hardware. The components of controller **1200** may be conventional components, such as those used in many conventional data processing systems, and may be configured to operate as described herein.

Fig. 13 is a block diagram of embodiments of data processing systems that illustrates systems, methods, and computer program products in accordance with aspects of embodiments of the present invention. The processor **1238** communicates with the memory **1236** via an address/data bus **1348**. The processor **1238** can be any commercially available or custom microprocessor capable of carrying out the operations required. The memory **1236** is representative of the overall hierarchy of memory devices containing the software and data used to implement the functionality of the data processing system **1200**. The memory **1326** can include, but is not limited to, cache, ROM, PROM, EPROM, EEPROM, flash, SRAM, and DRAM.

As shown in **Fig. 13**, the memory **1236** may include several categories of software and data used in controller **1200**: an operating system **1352**; application programs **1354**; and data **1356**. As will be appreciated by those of skill in the art, the operating system **1352** may be any operating system suitable for use with a data processing system, such as OS/2, AIX or System

390 from International Business Machines Corporation, Armonk, NY, Windows 95, Windows 98 or Windows 2000 from Microsoft Corporation, Redmond, WA, Unix or Linux, a real-time operating system kernel, and so forth. The application programs **1354** are illustrative of the programs that implement the various features of the data processing system **1200** and preferably include at least one application that supports operations according to embodiments of the present invention. Finally, the data **1356** represents the static and dynamic data used by the application programs **1354**, the operating system **1352**, and other software programs that may reside in the memory **1236.**

As is further seen in **Fig. 13**, the application programs **1354** may include a data acquisition module **1310**, a digital signal processing module **1320**, and a transmitter control program **1330**. These modules carry out operations as described herein such as the acquisition, conversion, processing, storage, and recreation of conditioned fields, potentials and waves. The exemplary modules **1310, 1320** and **1330** may operate in coordination with facilities of the operating system **1352** and obtain access to I/O ports **1246**, digital signal processor **1240**, mass storage **1248**, memory **1236**, and so forth.

The data portion **1356** of memory **1236**, as shown in the embodiments of **Fig. 13**, may include digital waveform representations **1360.** These may be used in various embodiments of the invention to generate predetermined waveforms. They may also be used to store digital representations of waveforms received from, e.g., digital signal processor **1240** or external analog hardware through I/O ports **1246** which may be under the control of data acquisition module **1310.** They may also be used for storing intermediate transformations of digitized signals such as sums and differences, phase-conjugate replicas, various spacetime curvature engines, and so forth. The digital waveform representations **1360** may also be used to produce specified transmissions from a transmitter, including interferometer transmitter systems as disclosed in various embodiments of the present invention. This may be done in various ways, such as by digital-to-analog conversion, which may be performed, for example, by digital signal processing software **1320** in conjunction with digital signal processor **1240,** or external signal generators via I/O ports **1246**. As will be apparent to one skilled in the art, these digital waveform representations **1360** can also be written to, and read from, mass storage devices such as storage device **1246**.

While the present invention is illustrated, for example, with reference to the data acquisition module **1310**, digital signal processing module **1320**, and transmitter control module **1330** being application programs in **Fig. 13**, as will be appreciated by those of skill in the art, other configurations may also be utilized while still benefiting from the teachings of the present invention. For example, these functions **1310, 1320, 1330** may also be incorporated into the operating system **1352** or other logical division of the controller data processing system **1200**. Thus, the present invention should not be construed as limited to the configuration of **Fig. 13** but is intended to encompass any configuration capable of carrying out the operations described herein.

Fig. 14A is a block diagram of a coder/decoder (codec) system for modulating a signal in the form of a conditioned scalar potential onto a conventional sine-wave carrier, to enable transmission of the conditioning by an ordinary prior-art transmitter at a first location, and its reception and demodulation at a second location. Beginning with modulator **1412,** desired conditioning to be imposed upon the carrier is represented by **channel number 1-4** inputs to signal processors **1402-1408.** Four signal processors are shown by way of example, although more or fewer can be used without departing from the spirit and scope of the invention. Given a determination that four channels, e.g., can adequately represent the bandwidth of the desired conditioning, the bias voltages of signal processors **1402-1408** can be 12, 8, 4 and 0 volts, respectively. It will be apparent to one skilled in the art that other bias voltages can be chosen as may be appropriate for the number of channels and bandwidth desired, which may be a function of the specific type of input signal to be transmitted. The function of each of signal processors **1402-1408** is: first, to create an antiphase (i.e. inverted) replica of a particular one of the input "Channel No." signals; and second, to sum said input signal with said antiphase replica in a nonlinear mixer. The output from each of processors **1402-1408 –** in the **Fig. 14A** example those being conditioned scalar potentials of 12 V, 8 V, 4 V and 0 V, respectively – is then directed as an input to nonlinear mixer **1410** and said potentials are combined nonlinearly. The output of mixer **1410** can then be transmitted conventionally. The nonlinear mixer used in each of **1402-1408** and **1410** may be any suitable nonlinear mixer, preferably one taught by the present invention.

To summarize the previously-described process of **1400,** a conditioned DC output produced by a conditioning aspect of the present invention can be used as input to a square wave oscillator (chopper). The output square wave may be directed through a filter network to provide a sine wave output carrier wave whose inner conditioning still carries the infolded signals that were used to impart the conditioning. This carrier may be transmitted conventionally (i.e. broadcast through space; sent over a cable, wire or optical fiber; and so forth), to transport a very large bandwidth upon media of very narrow bandwidth and limited frequency transport capabilities.

A similar arrangement in the receiving circuit outfolds (demodulates) the signals hidden within the conditioning into ordinary transversely-polarized EM signals, which then can be processed normally in follow-on circuits. Demodulator **1414** extracts the hidden conditioning from the conventionally transmitted carrier as follows. The carrier wave to be demodulated is input to block **1420**, where conventional means split the carrier into a multiplicity of voltage level outputs preferably corresponding to the particular voltage levels in the modulator **1412.** Each output is then directed to a respective chaotic oscillator **1422-1428**, which is biased at one of said voltage levels, and oscillates chaotically around said voltage with a predetermined bandwidth, which may be ±1 volt. Any suitable oscillator capable of performing these functions can be used, and it will be apparent to one of skill in the art that departures can be made from example with respect to the number of oscillators, bias voltages, bandwidth, and so forth, without altering the fundamental operation of the embodiment. All such departures are intended to be within the scope of the present invention; the example is given by way of illustration and not of limitation. The resulting outputs from each of oscillators **1422-1428** comprise demodulated signals for the respective input channels, and may be passed to conventional follow-on circuitry.

Fig. 14B is a block diagram of yet another embodiment for conditioning a scalar potential with an input signal and modulating the result onto a conventional sine-wave carrier for conventional transmission. In overview, the method involves the following steps. Introduce any signal frequency into two channels, where the first channel passes the signal unmodified and the second channel is adapted to delay the signal's phase by 180 degrees. Sum the unmodified signal and the antiphase signal in a nonlinear mixer, so that the net signal is zero. Filter any remaining small dither to ground to produce a very good net zero signal, biased at a

predetermined DC voltage output level. That DC voltage now contains the infolded zero-sum signal (the signal and its 180°-phase-shifted counterpart), i.e. it is now a conditioned scalar potential. Introduce the DC voltage onto an overpotential region of a potentialized gas. Simultaneously introduce DC pulses sufficient to exceed the gas's overpotential super ionization region and cause the ionization breakdown discharge of the gas. The pulsed DC output from the ionization breakdown then contains the infolded information. Feed the resulting pulsed DC output into an entrained LC oscillator circuit. The sine wave output of the LC oscillator will contain the infolded information. In this way a single-frequency carrier wave can be produced which nonetheless may carry a very large bandwidth of infolded frequencies. For example, in this manner a video signal may be transmitted on a conventional telephone line utilizing only one ordinary telephone carrier frequency, an achievement unmatched by any prior art technology. (By way of illustration, the bandwidth of a typical NTSC amplitude-modulated video signal, as transmitted on a VHF television frequency, is about 6 MHz, and a typical analog telephony voice signal is about 3 kHz.)

Referring now to **Fig. 14B** and particularly the modulator/transmitter section **1477**, input signal **1455** along with an antiphase counterpart **1460** is introduced into a nonlinear optically active mixer **1470** along with a selected carrier frequency **1465**. The mixer is preferably an embodiment of the present invention, but may be any suitable nonlinear optically active mixer. The mixer sums the signal **1455** and its antiphase signal **1460**, resulting in a net transversely polarized signal of zero. Mixer **1470** should include first, a conventional filter to remove any remaining AC and produce a good constant DC potential; and second, a nonlinear mixing function to produce a conditioned pulsed DC output. The output of mixer **1470** is then input into a suitable oscillator (not shown), such as a conventional phase-locked LC oscillator, that is adapted to produce a sine wave output from a pulsed DC input. The conditioned sine wave output (carrier) may then be transmitted conventionally (block **1475**).

Referring now to the receiver/demodulator **1479** section of **Fig. 14B**, the conditioned sine wave signal (carrier) output by modulator/transmitter **1477** is received conventionally in block **1480**. The signal is passed to optically active phase demodulator **1490**. Also input to the demodulator **1490** is the selected carrier **1465**, being the same frequency that was input into mixer **1470** in the modulator/transmitter section **1477**. Phase demodulator **1490** is adapted so

that the interference of carrier **1464** with conditioned carrier **1475** removes (demultiplexes) the carrier frequency from the multiplexed conditioned signal, leaving only a conditioned scalar potential (i.e., a zero potential at a given bias voltage, carrying the hidden conditioning in the form of longitudinal wave dynamics). This scalar potential is then passed to optically active voltage phase detector **1495**. Detector **1495** is adapted to demultiplex input signal **1455** from its antiphase replica **1460.** The output from detector **1495** is then passed to resistive signal detector **1498**, which may for example be a conventional pair of headphones, an audio speaker, a signal strength meter, or the like.

Fig. 15 is a block diagram of a system for interfering scalar potentials in a target zone using at least two transmitters and predetermined spacetime curvature engines. The example teaches how transverse EM waves can be converted to a "hidden" form, "invisibly" transmitted from a first site to a second site, then reconstituted. One of the system's inputs is a spacetime curvature engine that may be produced, stored, and reproduced as provided for elsewhere within this invention. The spacetime curvature engine is modulated upon a time-density wave, also called a scalar potential. The conditioned time-density wave may then be modulated upon a prior-art carrier according to **Figs. 14A-14B**. The resulting signal is passed to at least two transmitters and transmitted to a designated target zone. Interference between these conditioned time-density waves then reconstitutes the desired transverse waves in the target zone.

Referring now to **Fig. 15,** system **1500** has three major components: a controller **1200** and at least two transmitter systems **1520** to which the controller is operably connected. Each transmitter system contains a spacetime curvature engine generator **1540**, a signal processor **1550**, and a transmitter **1530** with a suitable antenna system attached, which is preferably an antenna array capable of transmitting a set of predetermined transverse EM carrier wave frequencies, for example radar frequencies or short wave radio frequencies. A desired spacetime curvature engine is designated at the controller **1200,** which transmits control signals corresponding to the desired spacetime curvature engine to each of spacetime curvature engine generators **1540**. The function of a spacetime curvature engine generator is to condition a scalar potential with predetermined input signals. Each generator **1540** transmits its output, a conditioned scalar potential, to a signal processor **1550** in its respective transmitter system. The signal processor may use a technique such as that described with reference to **Figs. 14A-14B** to

modulate scalar potentials from the generator upon a conventional carrier frequency. Under control of controller **1200**, each processor **1550** sends its output, a conventional carrier modulated with a hidden scalar potential that has been conditioned with a designated spacetime curvature engine, to its respective transmitter **1530**. Each of transmitters **1530** and particularly each of their antenna systems should be sited and adapted such that its beam can be directed toward a designated target zone. The spacing between the first and the second of transmitters/antennas **1530** should be chosen with consideration of the carrier wavelength, to yield the desired interference effects in the target zone. If they are too close together compared with the carrier wavelength, then the interference will be minimal, as the arriving wave fronts may be only slightly out of phase. Ideally they should be situated an odd multiple of one-half wave distant from one another. Alternatively, other methods well-known in the art such as phased arrays of small antenna elements may be used to achieve the necessary phase control. The beams carrying the conditioning are then directed toward the designated target, arrive in interference zone **320** out of phase, and interfere there. This demultiplexes and demodulates the conditioning, resulting in the emission of chosen transversely-polarized electromagnetic radiation in the target zone.

Fig. **16** is a block diagram of a variant system for scalar potential interference using multiple transmitter systems and producing the spacetime curvature engines from transverse waves. System **1600** is conceptually very similar to system **1500**. A primary difference is that in system **1600**, rather than reproducing predetermined spacetime curvature engines by means of a spacetime curvature engine generator **1540,** the engines are produced on-demand in a multi-stage process. A first process step is generation of transverse wave components by a transverse wave generator **1620** under the control of controller **1200.** A second process step is the operation upon said transverse waves by a first phase conjugator **1630**, whose output comprises pseudo longitudinal wave pairs**.** A third process step is the operation upon said pseudo-LW pairs by a second phase conjugator **1640** to produce conditioned time-density waves. A fourth process step **1650** is the conversion of the conditioned time-density waves by a spacetime curvature engine/transmitter into a form transmissible by a conventional EM transmitter. The conversion may preferably be done by a modulator **1412** or a modulator **1477**. The resulting conventional transverse EM waves carrying hidden conditioning **190** are then transmitted to a target zone.

Where the beams intersect, interference occurs and the transverse waves that had been input into the conditioning are reconstituted in the target zone.

The result in the interference zone may be exothermic (divergent, adding energy) or endothermic (convergent, removing energy). Biasing the electrical ground potential of scalar potential interferometer transmitters **1605** above the ambient ground potential in the interference zone **320** produces heating, while biasing it below produces cooling. This phenomenon can be used to cause heating or cooling in the interference zone, and in and throughout any mass therein. Sharply pulsing the exothermic transmitters can produce a hot (exothermic) explosion in the interference zone, while sharply pulsing the endothermic transmitters will produce a cold (endothermic) "explosion."

Fig. 17 depicts another scalar interference embodiment whereby a single transmitter with a steerable antenna may project a composite scalar potential beam created by mixing two conditioned scalar potentials. Unlike **Fig. 16**, however, rather than focusing on a predetermined spatial region, the composite beam may be swept until it contacts a selected mass at various distances and angles from the antenna, and may produce a desired vacuum engine therein to act upon said selected mass and accomplish the desired changes to it.

Referring now to **Fig. 17**, a block diagram of a single-transmitter swept-beam scalar potential interferometer system 1**700** is shown comprising a controller **1200,** a first time-density wave set generator **1715,** a second time-density wave set generator **1717,** a small delay generator/mixer **1705,** and a steerable transmitter/antenna unit **1710.** As in **Fig. 16,** a first set of conditioned time-density waves and a second set of conditioned time-density waves are created embodying at least one desired vacuum engine. Mixing the first and second sets of waves **1720-1730** in the delay generator/mixer produces a composite beam **1740**, which is then passed to the antenna unit and transmitted. By steering the antenna under control of controller **1200** through azimuth and elevation, the beam may be directed at a distant mass **1750** where range is unimportant. When the beam strikes the mass, the composite beam's conditioned scalar potential automatically produces interference in the material lattices, nuclei, molecules, atoms, etc. of an interference zone **320** within the mass, to form the at least one desired vacuum engine, at a distance which need not be predetermined. The beam can be swept across a multiplicity of

masses at different ranges and radial angles from the composite interferometer **1700.** For example, the beam can be played across a ditch or container containing a hazardous material to be treated, and gradually the selected vacuum engine forming in said material will alter and nullify the hazardous material. Such a system may have many uses, as will be apparent to one skilled in the art. Thus, the present invention should not be construed as being limited to the examples cited herein, but is intended to encompass any method that can be carried out by the apparatus and system described herein.

Fig. **18** illustrates an embodiment that may add or remove spatial energy from a distant target, and/or deterministically alter matter in the target zone, by means of interference of conditioned scalar potentials. Scalar interferometer transmitter system **1600** is preferably comprised of transmitter systems such as **1520** or **1605,** and a controller **1200**. Antennas **1710** may be of a conventional type suitable for transmitting a selected carrier wave frequency such as a radar frequency. The output of each antenna is a carrier wave with selected spacetime curvature engines modulated upon it, as previously described. In the **Fig. 18** example, the target zone **1800** may be a storage area for dangerous or environmentally harmful substances such as hazardous chemicals, nuclear waste, pathogens, and so forth. By selecting suitable spacetime curvature engines and causing their carrier waves to interfere in an interference zone **320** within the storage area, the substances may be altered from a safe distance by converting them to materials that are not harmful. It will be apparent to one skilled in the art that the **Fig. 18** technique may be applied to a variety of materials, which may be located at remote distances from the site of interferometer transmitter **1600.** It will also be apparent that the alterations may consist of the breaking of chemical bonds by heat; transmutation of an element to a different element or isotope thereof by flipping of quarks within the element's nucleons, causing protons to change into neutrons or vice versa; and so forth.

In another aspect, the apparatus of **Fig. 18** may be used to hasten the decay of long-lived and dangerous radioactive isotopes.

A further discussion will explain the particular mechanisms involved in modifying the decay rates of nuclear materials. Nuclear physics models assume that, within a heavy slow-decaying nucleus, there are α particles that "rattle around" a very large number of times before

spontaneously tunneling through the surface and escaping, to provide α decay. For the long-lived decay of ^{238}U, e.g., the α particle must present itself at the barrier some 10^{38} times before it succeeds in tunneling through. Hence an α-decay will likely occur on the average of once every 4 billion years! The disintegration energy of this long-lived ^{238}U nucleus is 4.25 MeV. However, the transmission coefficient of a barrier is very sensitive to small changes in the total energy of the particle seeking to penetrate it. As an example, a change in the disintegration energy to 6.81 MeV results in barrier penetration of the α particle very quickly – indeed, in only 9.1 minutes. By use of time-density charging, it is straightforward to raise the disintegration energy of an otherwise long-lived ^{238}U isotope to 6.81 MeV or even higher, after a certain longitudinal EM wave radiation time. (In this instance, the addition of necessary phase conjugates to accomplish time-density charging happens in the vicinity of the irradiated nuclear mass.) It follows that a readily usable process can be designed to decay the long lived ^{238}U isotope quickly, and similarly with other radioactive isotopes having very long half-lives. Indeed, "mixes" of appropriate spacetime curvature engines can be designed to minimize actual radioactive emission, with the vacuum itself undergoing energetic processes that accept the excess energy in virtual state rather than radiating it away into 3-space as observable transversely-polarized nuclear decay contaminants. Nuclear wastes can be irradiated at a safe distance by an interferometer such as **1600.** Alternatively, the interferometer **1600** can condition the local vacuum in a specified disposal region by projecting the desired spacetime curvature engines, which become imposed on matter in the region by time-charging and subsequently emitted over a period of time through the process of excitation decay. Then the isotopes to be nullified can just be transported into the area and "parked" there while the conditioned active vacuum performs the necessary nullifying electronuclear interactions.

Fig. 19 shows an apparatus that may serve to alter and nullify hazardous chemical wastes by creating time-reversal zones within a reaction vessel. A time-reversal zone has the characteristic of reversing the electrical attraction and repulsion forces upon many charges within the zone. In such a zone, a hydrogen bond may become an anti-hydrogen-bond, thus loosening the bonds. As the bonds break, the chemicals may be altered to harmless new forms. As an example, the H-bond interactions in a hazardous chemical compound are due to protons. As time passes and the time-reversal zone strengthens due to time-density charging, the exposed

hydrogen ions (protons) in the chemical acquire additional time-density charge, whereupon some begin to repel (due to the time-reversal of their attraction) while others continue to attract (due to the remaining time-forward component). As the time-reversal strengthens, repulsion equals and overtakes attraction, thereby dissolving the H-bond. The chemical thereby separates into component parts and component chemicals. Exposure can continue until the remaining chemical byproducts are harmless. In this manner, hazardous chemicals – including dangerous chemical warfare agents – may be rendered harmless. For the safety of operating personnel, the time-reversal zone may be established inside a protective reaction vessel from a little distance away.

Referring now to **Fig. 19**, a data processing system or controller **1200** is operatively connected to a detector array **1920** capable of detecting, by means of sensors **1950** positioned within a reaction vessel **1900**, the chemical composition or other physical parameters of the chemical being treated as may be necessary to determine when treatment is complete. The reaction vessel contains a multiplicity of phase conjugate apparatus **1000** with appropriate materials chosen to act as phase conjugate mirrors therein. A quantity of at least one chemical to be treated **1910** is placed within the reaction vessel in proximity to at least one phase conjugate apparatus **1000**. The production of time-reversal zones within apparatus **1000** is then enhanced by means of pumped phase conjugate mirrors **1010.** The pumping is carried out by the introduction of electromagnetic waves into the reaction vessel and into the midst of apparatus **1000**, by a multiplicity of suitably-placed antennas **1940**. Pumping is effective for the reasons explained with reference to **Fig. 9C.**

The method of **Fig. 19** will work on a multiplicity of hazardous chemicals at once, since H-bonds and other ionic bonds are affected, weakened, and dissolved in the various chemicals simultaneously. It will be apparent to one skilled in the art that such an apparatus can be employed advantageously in the processing of many different kinds of chemicals, including mixtures, and can also be used to enhance the production of desired chemical reaction products, rather than solely to decompose chemical wastes.

Fig. 20 is a diagram of an exemplary mobile interferometer system that may be used, e.g., to decontaminate an area such as a civilian city or a combat zone previously contaminated by biological warfare attack, chemical spillage, etc., to render it safe for human occupation and

living without protective masks and clothing. The system preferably makes use of an interferometer transmitter such as that described with reference to **Fig. 7** or **15** that is augmented with a scanning capability. In the **Fig. 20** embodiment, a target zone may be scanned (to determine the nature of the materials therein) through an area or volume at a distance. Thus this method may also be effective even when the type of contaminant is not known in advance.

The scanning may be done as follows. First, the interferometer device is set to endothermic mode, by biasing its ground potential lower than that of the target zone, to obtain a radiation signature (spacetime curvature engine) of substances in the target zone. The returned signature may be digitized and compared with a database of previously obtained signatures of known substances, to determine a best-fit match. The precise anti-engine corresponding to the determined signature may be read from the database, or calculated on demand, and passed to the interferometer, after first having been converted to a conditioned scalar potential modulated upon a conventional transverse EM carrier wave.

The interferometer is then set to transmit mode, by biasing its ground potential higher than that of the target zone, and the conditioned carrier is transmitted into the target zone for a suitable period of time, thus time-charging mass within the target zone with the selected anti-engine so as to render the harmful substance harmless. Alternatively, the signature returned by the scanning operation can be phase-conjugated on demand to produce an appropriate anti-engine, and the amplified anti-engine transmitted into the target zone.

Turning now to **Fig. 20**, system **1700** is an interferometer transmitter system preferably utilizing an embodiment of the present invention such as system **1500** or **1600,** having a controller **1200** containing a database that may be stored in mass storage **1248** of known spacetime curvature engines and their corresponding anti-engines. System **1700** also includes an interferometer transmitter/scanner device mounted on a team vehicle **2010**, which is preferably a chemical/biological/radiation (CBR) shelter vehicle to protect the occupants therein. An operator **2000,** who may ride within vehicle **2010** or may direct its operation remotely, operates system **1700** by interacting with processor **1200** by means of conventional data processing input and output operations such as a keyboard and display, wireless telecommunications link, or other equivalent means. The operator selects a target needing treatment such as a building **2020**, a

boat or equipment **2030**, a populated place **2040,** a vehicle **2050,** or other structure or place needing treatment, and by interacting with controller **1200** aims the interferometer scanner at an interference zone **320** in order to "read" the signature of the contaminant. Controller **1200** then compares the returned signal from the zone **320** with a database of signatures of known substances and determines the best-fit match using algorithms that are well-known in the fields of data processing and signal processing. The operator then sets the interferometer transmitter into a transmit mode and the determined anti-engine **720,** having been conditioned upon a scalar potential **190** and modulated upon a conventional transverse EM carrier frequency, is transmitted into the selected zone **320**.

The system of **Fig. 20** is further illustrated by **Fig. 21**, a flowchart showing steps of a process, according to embodiments of the present invention, to utilize a database of predetermined spacetime curvature engines in combination with interference between conditioned scalar potentials to alter and treat a specified agent such as a pathogenic agent. At step **2100**, a signature of the agent to be decontaminated is obtained. At step **2110**, a database is searched for an anti-engine appropriate to the determined agent. At step **2120**, if an appropriate anti-engine was found**,** control passes to step **2140** in which the controller **1200** is programmed with the determined anti-engine. Thereafter at step **2150** the target zone is irradiated with the determined anti-engine. At step **2160** a determination is made as to whether there may be additional agents requiring treatment. If the result of the determining step **2160** is YES, then control passes back to step **2100** and the process may be repeated as necessary. If at step **2120** the appropriate anti-engine was not found in the database, then control passes to step **2130** wherein the operator **2000** selects an alternate spacetime curvature engine that may be helpful to mitigate the contamination even though it may not be specific to that particular contaminant (e.g., hydrogen peroxide may be effective against multiple pathogens). Control then passes to step **2140** as previously described. If at step **2160** no more agents need treatment, then the process of **Fig. 21** ends.

Fig. 22 depicts a mobile system that may be used, e.g., for biologically decontaminating a target zone, preferably utilizing a database of predetermined spacetime curvature engines, according to embodiments of this invention. A mobile single-transmitter swept-beam scalar potential interferometer system 1**700** operated by an operator **2000** treats a designated

contaminated area **2230,** depicted in the illustration as farm land, although the treatment may be applied to a great variety of areas and types of contamination. The interferometer is set into scanning mode and the target zone scanned. The results as passed to controller **1200** and compared with a database of known contaminant signatures (not shown). If the type of contaminant matches a known signature and a database **2220** contains an appropriate anti-engine specific to the contaminant, the anti-engine is programmed by the controller and transmitted on conditioned scalar beam **190** into an interference zone **320.** If the type of contaminant is unknown or no specific anti-engine is available, the operator may select a mitigating anti-engine from database **2210** of general-purpose and broad-spectrum anti-engines and send it to the target zone.

Fig. 23A shows an apparatus that may be used, e.g., for neutralizing a biological agent wherein spacetime curvature engines are calculated for the specific agent, which may be a virus or a mycoplasma, and may include that same virus or mycoplasma even after it has already infected a living cell and dumped its genetics into said infected cell, thereby converting the cell to a host factory that makes more infectious agents (viruses). As an example, this would include a vaccine that is found to be contaminated by viruses (it is extremely difficult to produce bacterium vaccines, e.g., where the bacterium is not contaminated and infected by undesirable pathogens and viruses). As an example suppose a smallpox vaccine is inadvertently contaminated by HIV virus, of the type that induces AIDS. The need for the vaccine may be desperate, and no other vaccine available (such a scenario can easily arise, particularly in terrorist attacks on U.S. cities or impending attacks with smallpox agent). In this case, the "delta" spacetime curvature engine existing between (1) the normal vaccine bacterium without HIV infection and therefore with normal genetic material, and (2) the vaccine bacterium with HIV infection and altered genetic material) is determined or calculated. These resulting "delta" engines are then phase conjugated (time-reverse). Amplified time-reversed "delta" antiengines are then produced by the interferometer in its interference zone. The zone is scanned through the vaccine, with sufficient dwell time to produce time-reversal of the genetics in the bacterium, back to before the HIV virus dumped its genes. In this case, the genetics of the bacterium are altered from the "infected" case back to the "uninfected" case, and the vaccine is cleansed. **Fig.**

23A shows this methodology and process for decontaminating a biologically contaminated fluid, area, vaccine, etc.

A variant of the methodology may be used whereby in a desperate situation the contaminated vaccine is used to vaccinate the populace against smallpox. Then that populace is treated individually by scanning irradiation as described previously, to reverse the HIV infection and eliminate the HIV viruses and their genetics from the contaminated individuals.

Referring now more specifically to **Fig. 23A,** a block diagram depicts an interferometer system and apparatus **2300**, according to embodiments of the present invention, that may be utilized to perform the functions of system **1700** within a mobile decontamination system such as that described with reference to **Figs. 20** and **22**. Apparatus **2300** may be used to alter matter **2360** by, e.g., altering the rate of a nuclear reaction, such as to induce quick α-decay in samples of otherwise longer-lived isotopes, or to scan and/or alter a chemical agent or biological specimen. It may also serve to decontaminate a biologically contaminated fluid, vaccine, etc. when the contaminant is known. A first and a second interferometer transmitter unit each comprise a power unit **2310** providing power to a conditioned scalar potential beam unit **2320**, which is in turn operably connected to a beam transmitter **2330** and a beam receiver **2340.** The beam transmitter is adapted to transmit EM signals to, and the beam receiver is adapted to receive EM signals from, a scanning antenna horn or beam transducer **2350** that may be aimed at target matter **2360**. Both interferometer transmitter units are controllable by switch/controller unit **1200**, being a controller as previously described herein. The controller's function may be augmented by a conventional mobile display device **2380** and a conventional operator station **2385.** The controller retrieves a designated delta vacuum anti-engine embodying the delta between a normal and a contaminated fluid from a database, programs a photo unit **2380** and the interferometer transmitter units with the anti-engine, and applies the anti-engine to an interference zone **320** within the material under treatment. A photo unit **2380**, as will be described with reference to **Fig. 23B,** may be used to determine when sufficient time-charging has occurred and to monitor the progress of the **Fig. 23A** process.

In a variant of **Fig. 23A**, the method may be used even when the contaminant is unknown. If the particular genetics cannot be calculated (as for unknown variants of the

infesting virus), then the interferometer may shift to basic longitudinal EM wave pair transmissions, so that strong longitudinal EM pump waves are produced in the interference zone. That interference zone may then be scanned through the contaminated vaccine, with sufficient dwell time to time-reverse the infected bacterium and thereby reverse and eliminate the HIV genetic material. This is the simple "eraser" method, where the undesired infection in the bacterium is simply "genetically erased" by time-reversal (dedifferentiation back to a previous cellular form when there was no genetic infection).

In yet another variant, the **Fig. 23A** apparatus can be used to speed up the α-decay of atomic nuclei by inducing a change of nuclide in an isotope by increasing the energy of α-particles conventionally forming within the nucleus and approaching the edge barrier, thus causing quick quantum tunneling of the α-particle. As previously described, increasing the energy of the interior α-particles inside the long-lived isotope of ^{238}U so that the disintegration energy of the nucleus increases from 4.25 MeV to 6.81 MeV decreases the decay time from about 4 billion years to 9.1 minutes. The same is true of most other nuclei above the mass number of 4He. While it will be apparent to one skilled in the art that several embodiments for inducing quick α-decay can be produced from the principles taught herein, the induced α-decay in ^{238}U is given by way of example and not by way of limitation.

Referring again to **Fig. 23A**, a very precise “microscope” scalar potential interferometer uses laser-like beams to project conditioned scalar potentials upon a sample of material for close focusing in an interference zone. A small interference zone **320** is produced, and may be scanned inside a sample of a material **2360**, which may be ^{238}U, placed in the target zone. By means of controller **1200,** a spacetime curvature engine is chosen that is appropriate for adding energy to α-particles via time-charging. Conditioned longitudinal EM waves carrying the determined engine in each beam irradiate the material for an exposure duration sufficient to produce significant time-density charging in the material. Interference adds excess energy directly to the atomic nuclei in the material, and therefore in and on the free α-particles inside the nuclei. As the disintegration energy of the nuclei increases, α-particles begin tunneling through the edge barrier, slowly at first and then with increasing frequency. Conventional radiation detectors may be used to detect the onset of the phenomena, the emission of α-particles

by decay, and other energy-balancing decays that occur subsequently in the nuclei after each α-emission. A larger and more powerful version of the **Fig. 23A** embodiment can be used to scan and process larger quantities of radioactive wastes.

Referring now to **Fig. 23B,** a diagram is shown depicting a measurement instrument array **2398** suitable for performing the functions of photo unit **2380** for detecting the presence of time-density charging and the initiation of time-charge excitation decay. A multiplicity of detectors is arrayed through a space **2399** to be instrumented. The detectors may include thermometers **2395**, calorimeters **2392**, film radiation detectors **2393**, and radiation counters **2394**, all of which may be conventional varieties known in the prior art. The detectors may be operatively attached to a controller **1200** which is adapted to note state changes in the detectors. The array **2399** may also be operatively attached to a power meter **2391** that is adapted to measure the power input to the array. The detectors within the array **2398** are divided into three sets. A first set are detectors with very similar past time histories, so that all will agree in indicating the presence of either conventional or time-charge-related phenomena. A second set are detectors with very dissimilar past time histories, so that all will agree in indicating the presence of conventional phenomena, but not all will agree when time-charge-related phenomena are encountered. A third set are detectors adapted for detecting the onset of excess energy emission. Excess energy emission may be defined as a difference between the amount of input energy measured by the power meter and the amount of energy detected by said third set. Detection by the first set and not all of the second set indicates the onset of time-charging-related phenomena, particularly the involvement of longitudinal EM waves, time-reversal zones, and time-density excitation charging, as well as inversion of the laws of charge attraction and repulsion in time-reversal zones. When in addition to the foregoing (detection by the first set and not all of the second set) the third set detects, the presence of excess energy is indicated and the decay of time-density excited states is underway. At this point, the instrumented region is now an open dissipative system transducing longitudinally-polarized and time-polarized electromagnetic energy from the active vacuum. As such, classical thermodynamics no longer applies; instead, the nonequilibrium thermodynamics of an open dissipative system now applies.

Fig. 24 illustrates a modified electrolysis apparatus using engineered time-reversal zones to form quasi-nuclei which then "decay" into the new full nuclei; e.g., to form quasi-nuclei of deuterium nuclides and/or α particles which then decay into real deuterium nuclides and/or alpha particles as the time-reversal zone diminishes and reverts to a normal time-forward zone.

In a first aspect of this embodiment, deuterium is produced in an aqueous solution by adapting and altering normal electrolysis processes, via the deliberate use of time-reversal zones. First, a conventional electrolysis apparatus is assembled using an aqueous medium and palladium electrodes **2420** to adsorb H+ ions (free protons) **2430** from the normal ions in the solution. Next, a time-reversal zone **800** is formed, preferably as previously described with respect to **Fig. 10** or **11A**, preferably adjacent to at least one of the palladium electrodes. The time-reversal zone reverses the conventional electrical law that like charges repel. Within the zone, now H+ ions (protons) attract. The adsorbed H+ ions in the palladium electrodes thus exert a powerful attracting force upon H+ ions in the solution, so that they are attracted toward the palladium. Although the Pauli exclusion principle prohibits *individual* fermions from being time-reversed, in even multiples of 2, 4, 6, etc. fermions can be time-reversed by acting as pseudo-bosons. Using parentheses to indicate a quasi-nucleus not fully bound by the strong force but also bound by the reversed electrical force (attractive now rather than repulsive), in the time-reversal zone **800**, many of the free protons will be attracted together in pairs, in the following reaction:

$$(_1H^1 + {}_1H^1) \Rightarrow 2(_1H^1) \Rightarrow {}_2(D)^2 \qquad [1]$$

Equation [1] makes no sense in conventional nuclear or chemical reactions; however, in a time-reversal zone two protons may be attracted together, very closely, so that each enters the much-reduced strong force region of the other. They now constitute a pseudo-nucleus that is a novel isomer of deuterium, but still has two protons rather than a neutron and a proton. So long as the time-reversal zone holds, the two protons are bound firmly together by the reversed electrical force between them, now attractive rather than repulsive. Instead of negative virtual charges in the quantum-mechanical active vacuum being drawn to the ${}_2(D)^2$ nucleus, positive virtual charges are drawn to it. So the positive charge of the pseudo-nucleus increases nonlinearly, rather than decreasing due to the shielding by negative virtual charges as occurs in conventional

time-forward zones. To some extent the nucleus becomes "supercharged" by this unusual action of the virtual particles in the active vacuum in a time-reversal zone.

Then the time-reversal zone **800** is allowed to decay gradually and revert to a normal time-forward zone. As it does, the strong force recovers its normal strength much faster than the electromagnetic force zeroes and then reverses and recovers its normal direction and strength. Thus during the decay the two components of the quasi-nucleus are attracted even more strongly by the rapidly increasing strong force, so that extreme pressure toward formation of a true nucleus now exists and acts on the two components. Both charge and energy of the pseudo-deuterium nucleus and its constituent quarks are now highly unbalanced and in an excited state, and the $_2(D)^2$ nucleus is in a state of time-charge excitation. It decays in this case by flipping one quark in one proton, or by

$$_2\mathbf{(D)^2 \Rightarrow (_0n^1 + {}_1H^1 + energy) \Rightarrow {}_1D^2 + energy} \qquad \mathbf{[2]}$$

Some of the excess energy from the transition will radiate away as virtual photons absorbed by the readjusting vacuum itself; i.e., as a readjustment of the vacuum due to positive virtual charges surrounding the D nucleus being expelled and negative virtual charges rushing in, as the time-reversal zone disappears and time in zone reverts back to its conventional forward passage. The remainder of the energy may radiate away as ordinary photons, constituting excess heat in the fluid.

In summary, by deliberately producing a time-reversal zone, the electrical charge law is inverted to assemble like-charged (positively charged) protons into pairs. The strong force is significantly weakened and may even be very slightly reversed, and the gluon forces in the nucleons are significantly weakened so that the quarks therein are nearly free and easily flipped in orientation. Then as the zone decays from time-reversal to time-forward, the readjustment of the active vacuum and curved spacetime causes a quark in one proton to flip, converting that proton into a neutron, and this is a *preferred* reaction in this novel case. This converts the proton pair pseudo-nucleus into a true deuterium nucleus. The method is simple and relatively inexpensive, and it uses this particular one of a huge number of new and previously unrecognized "nuclide-assembly" nuclear interactions at low energy in what otherwise would be

merely conventional chemical interactions. Time-density energy is actually equivalent to highly compressed conventional EM energy, indeed on the order of that normally utilized in known nuclear reactions. This powerful energy is merely being used in compressed form, rather in the brute force form presently employed in high energy physics.

In a second aspect of the **Fig. 24** embodiment, helium 4 nuclei (alpha particles) may be produced in an aqueous solution by adapting and altering normal electrolysis processes, via the deliberate use of time-reversal zones and their decay. Again referring to **Fig. 24** and the previously-described apparatus, many of the protons in the time-reversal will be attracted together in fours, by

$$\mathbf{2(_1H^1 + {}_1H^1) \Rightarrow 4(_1H^1) \Rightarrow 4(_4P)^4 \Rightarrow {}_4(He)^4} \qquad \mathbf{[3]}$$

where (4P) means 4 protons in a pseudo-nucleus and ${}_4(He)^4$ means the pseudo nucleus of helium except that the normal 2 neutrons of helium each have one quark flipped so they are protons rather than neutrons. Equation [3] makes no sense in present nuclear or chemical reactions, which are considered in time-forward zones only. However, in a time-reversal zone it represents the attracting together of four protons, very closely, due to the reversal of the electrical repulsion into electrical attraction, and due to the dramatic reduction of the strong force. The four bound protons now constitute a pseudo-nucleus that is a novel isomer of helium 4, except that one quark in each of two of the protons is oriented wrong for helium, the gluon forces are significantly weakened, and the quarks are nearly freed and easily flipped. So long as the time-reversal zone holds, the four protons are bound firmly together by the reversed electrical force. As in the previous aspect, positive virtual charges are drawn to the pseudo-nucleus, which may become "supercharged" by some fraction. Then the time-reversal zone is allowed to decay gradually. As it does, both charge and energy of the pseudo-helium nucleus are now increasingly unbalanced, and the ${}_4He^4$ quasi-nucleus is in an increasingly excited state, now heightened by the rapidly increasing strong forces. The ${}_4(He)^4$ quasi-nucleus decays in this case by first flipping one quark in one proton, and then flipping one quark in another proton, or by

$$\mathbf{{}_4(He)^4 \Rightarrow (_0n^1 + {}_3H^3 + \ Energy) \Rightarrow 2(\ {}_0n^1 + {}_1H^1) \Rightarrow {}_2He^4 + Energy} \qquad \mathbf{[4]}$$

The decay process is similar to that described for the first aspect of the **Fig. 24** embodiment, with part of the excess energy being absorbed by the readjustment of the active vacuum and local spacetime curvature, and with the other part of the excess energy being emitted as normal transverse photons, comprising excess heat in the fluid.

Fig. **25B** is a block diagram showing a means of creating an amplified phase-conjugate replica wave by pumping a nonlinear medium. A phase-conjugate mirror **2555** can be any suitable nonlinear medium possessing the properties of a phase-conjugate mirror **1010,** as was illustrated and described with respect to **Fig. 25A.** An input wave **120** may be an ordinary, time-forward incident transverse EM wave impinging upon PCM **2555**. The PCM will emit a phase-conjugate replica **2570** of the incident wave**.** To obtain amplification of the replica wave, pumping is used. Pumping is done by inputting a multiplicity of transverse pump waves **2560** into the PCM **2555.** Within the nonlinear medium of mirror **2555**, the pump waves superpose with any other waves that may be present, causing their amplification. As a result of pumping, the time-reversed replica wave will have a larger magnitude than its corresponding input wave. The method **2550** of **Fig. 25B** may be utilized in embodiments of the present invention wherever it is desired to create a phase-conjugate replica wave that is amplified with respect to a given input wave, which may be a signal given off, e.g., from a mass, such as a living body. Such an amplified replica wave can be used to time-reverse a mass, as will be shown in **Fig. 26A,** or as part of a process such as that shown in **Fig. 26B** to induce desired state changes in a mass.

Fig. 26A depicts a time-reversal of a mass by applying an amplified vacuum anti-engine. Referring now to **Fig 26A,** a vector **2605** is the time axis of Minkowski space-time for the frame of reference within which a given mass exists. The vector **2605** represents the conventional forward direction of time-flow, and a point on said axis may be expressed mathematically as a positive value of a time variable. Thus on the axis **2605,** the mass at a current time value is represented by the mass **2620.** A mass **2630,** being the same mass as **2620** but at an earlier time (i.e. at a smaller value of the time variable on the time axis), may be considered a previous mass-state for the mass **2620.** A first vacuum engine **2625** represents the current set of spacetime curvatures (per general relativity and unified field theory) associated with and producing the mass **2620** and comprising its current physical and energetic state. A second vacuum engine **2635** represents the set of spacetime curvatures that was associated with and comprised the mass

2630 at the previous time depicted. In order to time-reverse the mass **2620** to its previous state **2630**, a third vacuum engine **2615,** called a delta anti-engine, must be created. The delta anti-engine is a phase-conjugate (time-reversal) of the exact difference between the first (current) vacuum engine **2625** and the second (previous) vacuum engine **2635**. Moreover, to time-reverse the mass **2620,** the magnitude of the delta anti-engine must exceed the magnitude of the current engine. The delta anti-engine may be created and amplified using embodiments of the present invention. One such embodiment is the pumping process **2550** in which transverse pump waves **2560** are pumped into the mass **2620**, and the mass that is desired to be time-reversed itself performs the role of the phase-conjugate mirror or nonlinear medium **2555.** Another suitable embodiment is the pumping of the mass **2620** by longitudinal EM waves, which constitutes pumping in the time domain and thus time-reverses the mass back to an exact previous physical condition.

Fig. 26B depicts an alternate embodiment making use of aspects of the process **2600** to alter a mass **2620** to a desired state that it may never have previously possessed. A second vacuum engine **2690** embodying a desired state to be imparted to the mass is utilized. The second engine may be created in various ways, as taught by the present invention. **Fig. 26B** depicts creation of the second engine **2690** from a chosen second mass **2692** having a prior mass state **2894** with an associated prior-state vacuum engine **2696**. The delta of longitudinal wave pairs comprising the first engine **2625** and LW pairs comprising the second engine **2690** is phase-conjugated to produce a combined delta anti-engine **2655.** In order to effect a state-change upon the mass **2620 –** as in the **2600** process – the delta anti-engine's magnitude must exceed that of the current engine **2625** of the mass being treated. Thus the delta anti-engine should likewise be amplified before use. Then applying the amplified delta anti-engine **2655** to the mass **2620** alters the mass along a delta spacetime trajectory **2675**. By controlling the precise make-up of the second engine, and consequently the derived delta anti-engine, the delta trajectory can be steered to any new state desired. In other words, after adding the second vacuum engine, pumping with longitudinal EM waves deviates the time-reversed trajectory. The mass and its internal structure are altered into a new form with a new structure which it need never have had previously.

Conditioned EM fields, potentials and waves may be used for the treatment of living cells, for the purpose of healing any form of cellular damage. **Fig. 27** is a block diagram of a treatment unit for treating a living body, utilizing several teachings of the present invention in combination. The embodiment shown in **Fig. 27** time-reverses an entire cellular mass – including altered genetics, as in AIDS – back to a previous healthy state. This embodiment is capable of reversing any kind of cellular damage or disease, including physical damage, genetic damage, damage due to infections, toxins, chemical poisoning, nuclear radiation, metabolic changes, etc. It is theoretically capable of reversing the physical effects of aging. Time reversal physically changes the cell and all its internal parts, including its genetics and the molecular constitution of its amino acids, proteins, etc. The limitation of this embodiment is that the treated cells can only be reversed back to those physical states in which the cells, or their progenitor ancestral cells, actually existed at some time in the past. Thus this embodiment is incapable of curing congenital defects, e.g., since the affected cells never possessed a normal state. On the other hand, cancer, leukemia, infectious diseases, hardening of the arteries, arthritis, and other diseases of cellular disordering from a previous normally ordered state, can all be treated and cured, since there existed previous normal states.

The following is a discussion of the theory involved in the embodiments that will subsequently be described with respect to **Figs. 27-29**. The embodiments take advantage of iterative phase conjugation interactions that can occur automatically in the highly nonlinear cells and tissues of an irradiated body. The wider the irradiation bandwidth, the greater the iterative phase conjugation. However, indiscriminately bombarding the body with broadband noise – as in the case of prior-art broadband noise irradiation with a Lahovsky oscillator – is not helpful, since the damage that could potentially be induced by random iterative phase conjugation could exceed such a treatment's healing potential. Instead, the body, its cells and tissues, and all their parts down to the smallest constituents, are used as phase conjugators. Transverse EM wave inputs must be limited to only the desired energies so that only the desired longitudinal EM pump waves and time-density waves will be produced. This invention discloses a remarkably simple, but non-obvious, means to accomplish this.

To ensure that phase conjugate radiation produced by shallow body tissues penetrates into deeper body tissues such as the bone marrow, a dense signal environment is induced with

multiple signals incident simultaneously. (This is contrary to the prevailing "energy deposition in tissue" view which credits the superficial intervening tissues with absorbing incident energy to block its passage deeper into the tissues. The porthole concept due to the dielectric channel applies, as is given in detail in the 108-slide "Porthole Concept" briefing attached to this provisional patent application.) On the other hand, a dense signals environment causes the gradual diffusion of phase conjugation, causing phase conjugates formed superficially to penetrate further into the body, and successive phase conjugates from those locations to penetrate still further, including into and through the bone marrow and stem cells and their parts. In effect, the interior of the body, cells, and tissues becomes an intensely-scattering but slow-scattering medium in a dense signal environment. This previously unknown deep penetration process is materially enhanced when the signals irradiating the body are numerous (so there are multiple simultaneous signals), and very broadband simultaneously. This solves the problem of deep penetration throughout the body. The difference frequencies, on the other hand, propagate directly and immediately throughout the body, via the dielectric channel and the porthole effect. The diffusion effect is a previously unexplored and uninvestigated long-term cumulative degradation factor in the EM "hash" or noise picked up by powerlines as long wire antennas and re-radiated in homes, offices, inhabited areas, etc.

Another problem is identifying the exact frequencies, amplitudes, phases, etc. of transverse EM energy with which to irradiate the body – to include the exact difference frequencies to match the 11 major Lisitsyn frequencies. The body emits EM radiation continually, as a very complex representation of processes happening throughout the body. The body medium itself may be considered as a highly nonlinear dielectric. As is well known, the reflected field from a dielectric material is not generated just at its surface but comes from everywhere in the interior of it [see Reali, 55]. Similarly, every part of the dielectric also participates in the absorption of an EM field on the surface of the dielectric. While ignored by conventional EM bioeffects analyses, it is true nevertheless, and already known in the physics of dielectrics. So in fact every tiniest internal bit of the human body – down to even the atomic nuclei and the nucleons – participates in the EM emissions from that body, and in the absorption of EM emissions by the body. It follows that innumerable EM pathways and frequencies through the body exist and directly participate in the EM energy transfer from the interior to the

radiating surface and subsequently in the surface emission. Those internal pathways may be considered as having propagated through a highly distorting, highly phase conjugating medium.

As is also known, but more obscurely, the phase conjugate retroreflection of a distorted signal leaving a highly distorting medium, initiated from outside said medium, will pass exactly back through the intervening tortuous pathways previously taken by all signal components, to the exact interior signal-initiation points. See Pepper [52]. What has not previously been accented is that by irradiating the body with a great density of external wide band signals, ordinary EM wave complexes will induce extensive phase conjugation by the absorbing body surface. Many of these body-induced phase conjugates will be phase conjugates of signals from deep within. The amplified phase conjugates then will backtrack ongoing interior body signals back through the entire body, all throughout its interior. Simply irradiating a body with transverse wave EM radiation will not generally cause sufficient penetration to precise participating body parts and cell parts unless broad bandwidth and dense signals are utilized. Otherwise, skin depth absorption and incoherent reradiation will limit its effectiveness and the radiation will not be able to reach the distant finer components of cells throughout the body.

Note the following peculiarity. If broad frequency bands and dense signals are used, the body will be penetrated deeply. The difference frequencies between even a lesser number of irradiation frequencies – say, 8 to 20 – will penetrate deeply in any case, throughout the dielectric. The difference frequencies are in fact oscillating curvatures of spacetime and oscillating waves in the local nonlinear vacuum itself. Multiples of these difference frequencies form engines that affect the body everywhere within. The invention deliberately utilizes this previously unrecognized deep penetration to produce highly beneficial restorative actions throughout the body and within its cells.

Phase conjugate replicas will be impressed upon many of the deeper internal outgoing signals, thereby converting to longitudinal waves. So a diseased cell at some depth in the body will thereby experience two things in all its internal components: (1) longitudinal wave pumping of every component, and (2) conversion of the time-reversal interaction from wave-reversal to mass-reversal. In short, by deliberately invoking and optimizing the body's own iterative phase conjugation processes, the present invention can cause the body itself to convert dense,

broadband, amplified irradiation of the body with transverse waves into time-reversal (dedifferentiation) of diseased or damaged cells – including their genetics – back to a previous undamaged, healthy state. *Spurious* spacetime curvature engines must not be introduced into a body or its cells as they can be detrimental. Only the precise spacetime curvature engine for each cell should be phase-conjugated, so as to produce a precise and beneficial anti-engine. The solution is to irradiate the body with precisely the same broadband, dense signal emission complex that the body emits from its own surface, which produces effects that – at any time during the irradiation – only act to reduce the difference between the abnormalities in the present physical state of the cell and a past healthy and normal state of the cell. To alter the body's cells and their components physically to a previous healthy condition in a short time, the radiation complex must be amplified before being used to irradiate the body.

A mechanism and embodiment to accomplish this is depicted in **Fig. 27.** The entire complex of radiations from the body is first precisely recorded, across a wide bandwidth of frequencies, and including all signal phases and amplitudes. This complex is then amplified and fed back to the body. The reference phase of the fedback signal, versus the reference phase of the emitted signal, is adjusted to produce maximum effect on the body.

Because every iota of the body is involved and the irradiation into the body is amplified to be greater than the emitted radiation from the body, the stress on the body is significant and builds as a function of amplification and irradiation time. In practice the irradiation time is limited to very tolerable stress levels of the interiors of the cells, tissues, and body components, by simply reducing the amplification used and extending the time of the irradiation. For dire life-threatening emergencies, very short irradiation time by more amplified signal complexes is indicated. For intense (high amplification) irradiation, very short radiation times (e.g., one minute) are sufficient. For other than life-threatening situations, less amplification and longer irradiation time (e.g., five minutes) is indicated. For a given level of radiation and a given embodiment, in a life-threatening situation one should start with only 30 seconds of whole body radiation. After one week, a second 30-second irradiation may be used. If indicated, a third 30-second irradiation may be used one week thereafter. For more normal situations that are not immediately life-threatening, embodiments having lesser amplification and longer individual radiation times (several minutes) are utilized.

Using laboratory animals to calibrate a given embodiment and amplification, one may use a short radiation time of 15 seconds, then individual radiation time by additional 15-second intervals, establishing a "high stress" baseline. One then may adjust the individual radiation time by additional 15-second increments with proportionally decreased amplification, thus calibrating the system to determine ideal radiation amplification and time versus stress levels, for different conditions. Once the individual embodiment is calibrated for the optimal amplification and length of irradiation versus stress level permissible for the urgency of the situation, the embodiment is just set to the requisite irradiation time for each weekly irradiation usage, for each class of urgency in the treatment.

Although other treatment methods based on various teachings of the present invention may be apparent to one skilled in the art, and are within the scope of what is claimed, the **Fig. 27** embodiment provides significant advantages over other treatment methods. Transduction of the transverse EM waves by the body tissues themselves avoids the need for external apparatus to produce longitudinal waves in plasma tubes or other paraphernalia.

The **Fig. 27** treatment unit takes advantage of the body's nonlinearity to produce phase conjugate pumping of signals from the interior of the body moving toward the surface, so that the phase conjugates then backtrack deeply back throughout the body, coupling with the body's own interior transverse wave emissions, thereby forming longitudinal EM waves. Further phase conjugation of these longitudinal EM waves transduces them to time-density waves, so that the body cells and all their parts are pumped in the time domain. This time-reverses the masses of the cells and their components, causing damaged, deteriorated, or diseased cellular masses to dedifferentiate back to a previous healthy physical condition, thereby producing healing of the body's cellular damage, disease, or deterioration.

In concept, the **Fig. 27** process uses recording of the wideband emission of transverse EM wave signals (including frequencies, phases, and amplitudes thereof), emitted by the body, amplifying said recorded signals, and then retransmitting them so as to irradiate the body with its own amplified broadband transverse EM wave signal complex, thereby causing the body surfaces and near-surface tissues and cells to perform phase conjugation, thereby time-density-pumping the deep interior cells of the entire body, to cause time-density pumping and cellular

reversal (dedifferentiation) back to a previous healthy condition. The procedure may be utilized to reverse debilitation and deterioration of cells, tissues and components of the body due to aging, even in the absence of infectious disease or obvious physical damage, thereby rejuvenating the body and reversing the effects of aging.

Referring now to **Fig. 27,** a diagram of a treatment unit is shown. The unit's electrical components may be powered by a conventional electrical power source that has been omitted from the figure for the sake of clarity. The controller **1200** is preferably a data processing system as previously described with respect to **Figs. 12-13,** and may be a conventional mobile computer adapted to perform the functions required. Blocks **2720-2740** comprise an electromagnetic wave conditioning unit **2700**, as will be further described.

Each one of a multiplicity of frequency generators **2720** is adapted to generate a selected transverse electromagnetic wave that preferably comprises an input to a conditioning process. Each frequency generator is also adapted to be individually controllable by the controller **1200** as to the frequency, magnitude, and phase angle of its emitted wave. The frequency spectrum spanned by the set of frequency generators **2720** is at least one harmonic interval, but preferably utilizes at least S.K. Lisitsyn's [13] eleven specific frequencies, known to be key among all of the optical frequencies emitted by the body, plus several additional frequencies for applying the necessary dynamics to the signal conditioning. The frequency generators are operably connected to a mixing unit **2730**; both the mixing unit and a magnetic pulse generator **2740** are in turn operably attached to the controller and adapted to be controlled by it. The frequency generators' outputs feed into the mixing unit, which may be a plasma mixing unit or other configuration capable of performing nonlinear mixing, superposition of longitudinal waves, and conditioning of time-density waves; the mixing units of **Figs. 8B**, **9A, 9B** are illustrative of plasma mixing units capable of performing these functions. The mixing unit **2730** is operably attached to the magnetic pulse generator **2740**, wherein the mixed waves, potentials, and fields output by the mixing unit are imposed upon a magnetic field by the magnetic pulse generator, under control of the controller.

A living body to be treated is preferably placed between, or in close proximity to, a multiplicity of antenna pads **2760**, which are preferably two in number. A conditioned magnetic

field or pulse emitted from the magnetic pulse generator **2740** is directed, through an operable connection, to a first antenna pad **2760**, which is adapted for transmitting a plurality of electromagnetic frequencies into the body. Antenna pads **2760** may be similar to conventional electric blankets in which a suitable grid or mesh of conductors is emplaced into a fabric so as to create an antenna pad which is comfortable for a patient yet capable of performing the electromagnetic functions required. A second antenna pad **2760** is preferably positioned where it may receive EM signals emitted from the body. Both antenna pads are operably connected to a field sensor **2750** that is adapted to detect at least one of electromagnetic fields, potentials and waves, and preferably detects the EM emissions from the body under treatment. The sensor **2750** is in turn adapted to feed said emissions and/or information about the emissions to the controller **1200**, to which it is operably connected. Wherever the term "body" is used herein, it should be understood that the treatment may be applied to a part of a living body; i.e., the patient's arm, leg, etc. could be placed into the apparatus for treatment of that limb or body part. It will be apparent to one skilled in the art that through utilization of timing, phase control, switching, and so forth, a single antenna pad **2760** may be made to serve the functions described with respect to both the first and second antenna pads.

In summary, in operation the treatment unit of **Fig. 27** may detect EM signals emitted by a body via a field sensor, calculate phase-conjugate replicas of said signals, cause a bank of frequency generators to create the necessary time-reversed replica signals comprising an amplified spacetime curvature anti-engine precisely tailored for the body's current state, condition them upon a suitable carrier such as a magnetic field, and expose the body to the resulting carrier and thus the anti-engine, so as to time-reverse cells of the body, including but not limited to diseased and damaged cells, to their previous and healthy states.

A variant, not illustrated, on the treatment unit shown in **Fig. 27**, combines **Fig. 27**'s sensing and phase conjugation of EM fields emitted from a living body with a selected second vacuum engine **2690** representing a normal and healthy state desired for said body, as described with reference to **Fig. 26B.** This variation can augment the **Fig. 27** process with the capability of treating genetic disorders, birth defects, and the like. This variant overcomes **Fig. 27's** restriction to the actual timeline traversed by the cells (or matter) from a prior value on the time axis to a present value thereon. It can alter the trajectory through time of the treated cells, so that

the cells can be changed into any form desired. This variant can produce differentiation, dedifferentiation, and even total change of cellular form outside the entire normal growth and development process.

While the present invention is illustrated, for example, with reference to a particular configuration for conditioning electromagnetic fields, potentials and waves, as will be appreciated by those of skill in the art, other configurations capable of performing the required functions, including but not limited to producing an selected amplified vacuum anti-engine, may also be utilized while still benefiting from the teachings of the present invention. Thus, the present invention should not be construed as limited to the exemplary configuration of **Figs. 27-29,** but is intended to encompass any configuration capable of carrying out the operations described herein.

Fig. 28 is a further illustration of the **Fig. 27** system for treating matter with conditioned electromagnetic waves, as it may be constructed for rapid deployment in an emergency or medical treatment setting, and is again intended by way of illustration and not of limitation. System **2800** consists of a controller **1200** operably connected to an EM wave conditioning unit **2700** by means of a conductor **2820** which may carry control signals bidirectionally as described with respect to **Fig. 27**. The conditioning unit **2700** is in turn operably connected to at least one antenna pad **2760** by means of a conductor **2830** that is adapted to carry signals received from the at least one antenna pad as well as to transmit conditioned signals comprising an amplified vacuum anti-engine from the conditioning unit **2700.** The antenna pad **2760,** as depicted, may comprise a blanket adapted to serve as an antenna unit and may be placed upon the body of an individual under treatment **2805.** An equipment case **2810** may be provided that is adapted for securely storing and transporting all the parts of mobile treatment unit **2800**.

Fig. 29 illustrates a non-portable embodiment more suitable for hospitals and research facilities. Its operation is identical to that described for **Figs 27** and **28**.

The flowcharts, illustrations, and block diagrams of **Figures 1** through **29** illustrate the architecture, functionality, and operation of possible implementations of apparatus, systems, methods and computer program products according to various embodiments of the present

invention. In this regard, each block in the flow charts or block diagrams may represent a module, electronic component, segment, or portion of code, which comprises one or more executable instructions for implementing the specified function(s). It should also be noted that, in some alternative implementations, the functions noted in the blocks may occur out of the order noted in the figures. For example, two blocks shown in succession may, in fact, be executed substantially concurrently, or the blocks may sometimes be executed in the reverse order, depending upon the functionality involved. It will also be understood that each block of the block diagrams and/or flowchart illustrations, and combinations of blocks in the block diagrams and/or flowchart illustrations, can be implemented by special purpose hardware-based systems which perform the specified functions or acts, or combinations of special purpose hardware and computer instructions.

In the drawings and specification, there have been disclosed typical illustrative embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims.

NOTE REGARDING CLAIMS:

In the discussions contained in this Provisional Patent Application we have included many major elements which obviously are bases for claims as we technically understand them without recourse to attorney. A later formal patent application will be legally prepared by a skilled patent attorney so as to accurately describe the claims for this invention. In addition, as is customary practice, in our formal patent application submission we will request that the Patent Examiner point out any resulting claims we may have inadvertently missed, and that he point out any relevant changes that should be made to clarify the submitted claims, and that he point out any unintended duplication of claims should such inadvertently occur.

Appendix A, "Porthole Concept" briefing, is attached hereto as part of this provisional patent application.