Professor Dr. C. Jarlskog
Nobel Committee for Physics
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?? June 1998

Dear Dr. Jarlskog:

Whereas it is relatively simple to recognize an important experimental discovery in physics, the evaluation of the contributions of an outstanding theoretical physicist requires exceptional understanding of mathematics and physics. For these reasons, I hereby submit to you the Nomination of

Professor Dr. Ruggero Maria Santilli
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for

THE 1998 NOBEL PRIZE FOR PHYSICS

In this century, physicists were educated under the influence of Einstein's special (STR) and general (GTR) theories of relativity, the Galilei covariant quantum mechanics of Schroedinger, and the Lorentz covariant quantum mechanics of Dirac. These theories are considered to be the greatest achievements of our times by the physics establishments of most Nations. In spite of the known difficulties of these theories in comparisons with experiments and their valid theoretical criticisms in the later writings of H.Alfvén, L.Brillouin, P.A.M.Dirac, S.Chandrasekhar, and even Einstein, - it is still inconceivable to most physicists to think beyond Einstein, Dirac, and Schroedinger.

As will be shown in this recommendation, it is the sole merit of Prof.R.M.Santilli to have gone beyond the 'accepted' theories of modern physics, by developing in the past 30 years generalized theories of classical mechanics and electrodynamics, quantum mechanics, nuclear physics, relativity and gravitation, - which are now collectively known as "Santilli's hadronic physics."

THE HADRONIC PHYSICS OF R.M. SANTILLI

Dr.Santilli's research is documented in over 200 publications in the most prestigeous scientific journals and twelve advanced monographs on theoretical physics [1-8], all quoted frequently in the international physics and mathematics literature. Dr.Santilli's *hadronic physics* is applicable to hadrons, i.e., *extended* particles such as neutrons, protons, πmesons, etc, which interact through the strongest forces known with a range of order $\lambda = \hbar/mc \sim 10^{-13}$cm. The methods of hadronic physics are equally applicable to *extended* electrons, protons, atoms, molecules, ions, etc, which interact through long-range electromagnetic forces. Thus, hadronic physics permits a realistic evaluation of physical phenomena inside (i) heavy nuclei and dense hadronic matter in general, (ii) *dense* gases, plasmas, liquids, and solids; many-electron atoms and molecules; and (iii) matter under extreme conditions, e.g., in the interior of neutron stars, supernovae, and black holes. These major efforts in theoretical and basic physics led Dr.Santilli to equally important discoveries in mathematics, in particular in the areas of field theory, group theory, algebras, transformation theory, and differential geometries of many-dimensional spaces, for which he is equally recognized among mathematicians worldwide ("isomathematics," "genomathematics," "hypermathematics," and their isoduals [1-7]).

Dr.Santilli started his research on hadronic physics by generalizing *classical* Hamiltonian mechanics to nonlinear, non-Hamiltonian (nonconservative), nonlocal mechanical systems (e.g., extended projectiles of given shape moving with a wave resistance nonlinear in the velocity at supersonic speeds). Subsequently, Dr.Santilli made his epochial contributions to physics through the development of hadronic quantum mechanics, hadronic nuclear physics, and hadronic relativity and gravitation theory, under consideration of these experimental facts: (i) all physical systems interact with the surrounding ordinary or hadronic medium (in general inhomogeneous and anisotropic) and the *physical* vacuum, and with each other through long-range forces and short-range hadronic forces and (ii) physical systems and particles have nonvanishing size, and are deformable in strong, short-range interactions and interpenetrations. Whereas in Einstein's or Lorentz-covariant physics interactions occur through local (non-contact) potentials (classical and quantum Hamiltonian systems) for particles *assumed* to be mass points since real, extended particles would violate the relativistic causality principle. *As a consequence, in hadronic physics Einstein's Lorentz covariance (STR) or general covariance (GTR) are replaced by Santilli's generalized covariances for nonlinear, nonlocal, nonconservative interactions of extended particles [1-7].*

In these hadronic theories, Dr.Santilli distinguishes between *exterior* and *interior* problems. E.g. the quantum dynamics of the electrons of an atom (radius $\sim 10^{-8}$ cm) in the Coulomb field of a nucleus can be treated approximately as an *exterior* problem for *point* particles, if the electron wave functions overlap only slightly. Whereas the quantum dynamics of the neutrons and protons of a nucleus (radius $\sim$ 1 Fermi = 10^{-13} cm) represents an *interior* problem for *extended* nucleons (n,p) with interactions through weak long-range electromagnetic forces and strong short-range hadronic forces up to distances of 1 Fermi.

1. Santilli's Hadronic Classical Mechanics [1,2,6,1,2*,6*].* The recognition of the general properties of hadronic classical mechanical systems and the formulation of the mathematical methods for the analysis of nonlinear, nonconservative, non-Hamiltonian mechanical systems is due to Dr.Santilli. These hadronic classical systems are distinguished through nonlocal, integral, nonpotential forces for extended and deformable systems and particles, in addition to local potential forces. Classical hadronic mechanical systems (rigid and elastic bodies, fluids, gases, plastic media) are in general described by systems of *macroscopic* nonlinear, partial differential and integral equations with dissipation of linear and angular momenta and kinetic energy, or systems of *microscopic* nonlinear integro-differential equations (hadronic, irreversible microscopic gas, fluid, and solid state dynamics in *velocity space*). *Using his experience with differential geometries of manydimensional spaces, group theory and algebras, Dr.Santilli developed systematic methods for the mathematical evaluation of such hadronic classical mechanical systems, known as iso- and geno- differential & integral calculus [1,5,1*,5*].*

Lie-isotopic & Lie-admissible Generalization of Galilei-invariant Newtonian Mechanics [3,4,6,3,4*,6*].* Dr.Santilli generalized the classical equations of Newtonian mechanics, which are Galilei invariant, to systems with extended, nonspherical, and deformable particles under nonlinear, nonlocal, and non-Hamiltonian forces. *This was accomplished through the invention of the iso-Galilean and geno-Galilean relativities, which represent generalizations of the orthodox Galilean relativity. These new fundamental hadronic equations are of great practical importance, since they represent a theoretical basis for practical applications in various areas of applied physics.* An extremely valuable application would be the development of field equations for plastic (deformable) media from first principles. The present *phenomenological* equations for plastic media used in technology and geology are inadequate since they contain many unknown phenomenological parameters (permitting curve-fitting of experimental data).

2. Santilli's Iso-special and Geno-special Relativities [3,4,6,3,4*,6*].* Real measurements (not to be confused with thought-experiments) require physical units, in particular units for length (usually 1m) and time (usually 1 sec). In Einstein's STR, the velocity of light is a Lorentz invariant, i.e., $c = \Delta d/\Delta t$ is assumed to be (i) the same for all inertial frames of observation and (ii) the upper limit for all *physical* velocities in any observation frame. As noted by L.Essen (1971), the *STR can not be used for real measurements within the global positioning system since c = L-inv does not allow independent definitions of the units of length and time for the measurement of distances Δd and time intervals Δt.* Since all relativistic measurements depend on the velocity v relative to the observer, the STR units of length and time vary with $(v/c)^2$ so that observers in different inertial frames K(v) and K'(v') can not even agree on the physical units they have to employ by STR-definition, nor can they agree on the different v- and v'-dependent measurement results.

Dr.Santilli's discovery of the isotopies of the Minkowskian geometry and the Poincaré symmetry, led him to a new isotopy and reformulation of the STR, which permits (i) definition of independent units for length and time measurements as well as (ii) sub- and super-luminal velocities of light in different inertial frames. *Thus, Dr.Santilli achieved (i) the first physically sound relativity theory for inertial systems and (ii) a sound theoretical basis for measurements in high energy physics, now known as iso-special and geno-special relativities [3,4,6].*

3. Santilli's Hadronic Quantum Mechanics [6,6*]. This is an axiom preserving quantum mechanics for real, extended particles and antiparticles with strong, nonlinear, nonpotential, nonlocal interactions due to the overlapping of wave packets and charge distributions of hadrons (and weak long-range electromagnetic interactions). *Dr.Santilli showed that as a result of the strong short-range interactions, the shape and electric and magnetic moments of extended particles are changed and mutated, respectively (confirmed through measurement of anomalous large magnetic particle moments).* Hadronic quantum mechanics has little effect on ordinary atomic structures with characterisic length scales of order 10^{-8} cm >> 1 Fermi, i.e., hadronic quantum mechanics recovers orthodox Schroedinger and Dirac theory identically for systems with mutual particle distances very large compared to 1 Fermi. Dr.Santilli distinguishes between isotopic (closed systems with total energy conserved) and genotopic (open systems with non-conserved total energy) quantum systems.

(a) *Santilli's Hadronic Schroedinger Equation [6,6*].* *Extended particles without spin at infra-luminal velocities $v << c$ imbedded in a dense hadronic medium are described by the hadronic Schroedinger equations for (i) one-body and (ii) many-body quantum systems due to Dr. Santilli.* The particles experience (in addition to local, potential interactions) nonlinear (in all variables, including derivatives of the wave functions), nonlocal, and noncanonical interactions with the extended medium particles.

The hadronic Schroedinger equations permit, for the first time, (i) to analyze the effects of linear and nonlinear friction (nonpotential interactions) on quantum systems and (ii) to calculate the properties of quantum solids and quantum fluids under highest pressures by rigorously considering the deformations of the atoms respectively molecules. These equations also form the theoretical foundations for the evaluation of the thermodynamic functions of nonideal statistical systems, e.g., liquid plasmas as encountered under the extreme pressures in fission and thermonuclear explosions. *Dr.Santilli demonstrated that the extended (spinless) particles have hadronic angular momenta and eigenvalues which are different from those of the ordinary Schroedinger equation.* Furthermore, *Dr.Santilli proposed by means of the* *hadronic Schroedinger equation the possibility of quasi-cold fusion of deuterium under extreme pressures with an energy output of 2.45 MeV per reaction* (d + d = He_3 + n + 2.45 MeV). *Another significant application is Dr.Santilli's explanation of a new molecular binding force and energy between the neutral atoms from first principles of hadronic quantum mechanics, i.e., without the involvement of adjustable parameters* (used in contemporary quantum chemistry). *The many-body hadronic Schroedinger equation would permit an exact calculation of the properties of solids from first principles, i.e., without the use of local, binary pseudo-interaction-potentials* (with different adjustable parameters for each type of solid, which form the *approximate analytical* basis of present solid state physics). The application of the hadronic Schroedinger equation to an exact solution of the solid state many-body-problem still remains to be executed. *Within hadronic many-body interaction physics, Dr.Santilli succeeded in the first exact (numerical) solution of the Bose-Einstein condensation problem for extended, deformable particles with integer spin.*

(b) Santilli's Hadronic Dirac Equation [6,6]. For extended particles and antiparticles with spin 1/2 interacting with a hadronic medium at subluminal velocities v < c, Dr.Santilli's hadronic Dirac equation (in the isotopic or genotopic formulation) holds. The hadronic interactions result in a measurable alteration of the Dirac gamma matrices and the particle's angular momentum.* The hadronic Dirac equation permits to study, e.g., the external, strong, short-range, nonlinear, nonlocal, noncanonical interactions of the extended electron or positron with extended hadrons, in the simplest case a proton. *An important application to superconductivity is Dr.Santilli's calculation of the attractive force between two electrons (Cooper pair). Under interior conditions, the hadronic interactions lead to a mutation of the intrinsic (due to spin) electric and magnetic moments of the electron (positron). In addition, Dr.Santilli discovered novel (modified by hadronic interactions) superposition laws for the spin and angular momentum of extended particles with spin 1/2 confirmed by spectroscopic data.*

An other epochial application of hadronic quantum mechanics led Dr.Santilli to the first calculations of the anomalous magnetic moments of the proton, neutron, deuteron, triton, and other few-body nuclei in full agreement with the values found by nuclear spectroscopy. Furthermore, he predicted the quasi-cold fusion of an electron and proton (both spin 1/2) into a neutron and a vacuum excitation ('neutrino') under high pressures with an energy output of 1.3 MeV per reaction (p + e = n + ν + 1.3 MeV). The interior of a proton (net charge e > 0) or neutron (net charge e = 0) represents a hadronic medium. By means of hadronic Dirac equation, *Dr.Santilli could show that these particles have a positive and negative charge structure, in agreement with the experiments of R.Hofstaedter (1957,1961). All these results of the hadronic Dirac equation are outside the capabilities of conventional nuclear and quantum physics.*

(c) Santilli's Hadronic Klein-Gordon Equation [6,6].* This novel equation holds for a particle with spin 1 or a photon (quasi-particle with spin 1), within an inhomogeneous, anisotropic hadronic medium. As a basic equation, it does not contain an *external* potential acting on the particle or the photon, i.e., it describes the interaction of the particle or photon with the hadronic medium.

(d) Quantum Electrodynamic Implications [6,6].* The electromagnetic and gravitational field energies of *extended* leptons and hadrons are necessarily finite, nor do electromagnetic waves exist up to infinite frequencies due to high-frequency breakdown of the hadronic (or any other interacting) medium or the *physical* vacuum. *This removal of the physical causes of the field and energy divergencies in conventional quantum mechanics and quantum electrodynamics [caused by the relativistic requirements of (nonexisting) (i) point particles and (ii) radiation spectra with unlimited frequencies $0 < \omega \leq \infty$] is an other significant result of Dr.Santilli's hadronic quantum mechanics.* Feynman, Schwinger, and Tomonaga are recognized for their *mathematical* renormalization schemes; however, these *formal tricks* failed to remove the *physical* cause of the divergencies (invalidity of Lorentz invariance, i.e. of point particles and $0 \leq \omega \leq \infty$).

4. Santilli's Hadronic Gravitation Theory [3,4,6,7,3*,4*,6*,7*]. Einstein formulated his gravitation theory for the *exterior* problem of a test mass in empty space interacting with the gravitational field of a source mass. For this special case, he arrived at his tensorial gravitation equation in curved 4-dimensional space-time with metric tensor $g^{\mu\nu}$: $G^{\mu\nu} \equiv R^{\mu\nu} - (1/2)g^{\mu\nu}R = \kappa F^{\mu\nu}$, where $\kappa = 8\pi K/c^4$ (K = gravitation constant), $R^{\mu\nu}$ is the truncated Ricci or curvature tensor, R is the scalar curvature invariant, and $F^{\mu\nu}$ is the energy-momentum tensor of the matter present (gravitation source). For regions of space without masses, Einstein's field equation reduces to $G^{\mu\nu} = 0$. Dr.Santilli noted the following deficiencies in Einstein's theory (believed to be universally valid), which guided him to the following discoveries:

(a) Santilli's Completion of Einstein's Gravitation Theory [6,7,6,7*].* Since the elementary particles e, p, n have magnetic and electric spin moments and internal (±) charge distributions, they exhibit not only an internal but also an external electromagnetic field structure in vacuum. All macroscopic bodies consist of the named elementary particles. Accordingly, neutral macroscopic bodies have a corresponding internal and external electromagnetic field distribution. The vacuum carries zero-point electromagnetic fluctuations (T = 0°K) and in addition cosmic microwave fluctuations at a temperature T ≃ 2.7°K. All these effects contribute a gravitation source tensor $T_{EM}{}^{\mu\nu}$ (Santilli EM tensor) of electromagnetic origin to the r.h.s. of the gravitation equation, which exists also in the vacuum space between test and source masses (the strong and short-range interactions produce a similar

Santilli source tensor $t^{\mu\nu}$ usually of negligible magnitude). *Thus, Dr.Santilli recognized that the electromagnetic origin of mass requires the identification of both gravitational and electromagnetic fields in the exterior and interior problems of gravitation.*

The Einstein tensor $G^{\mu\nu}$ is geometrically incomplete because its isotopic image in iso-Riemannian spaces does not preserve its covariant zero divergence. This led Dr.Santilli to the *completed* Einstein tensor (now known as Santilli tensor) which preserves the vanishing of its divergence under isotopy: $S^{\mu\nu} = G^{\mu\nu} + (1/2)g^{\mu\nu}\Theta$, where $\Theta = \Gamma_{\alpha\beta\gamma}\Gamma_{\mu}{}^{\alpha}{}_{\nu}(g^{\beta\nu}g^{\mu\gamma} - g^{\beta\gamma}g^{\mu\nu})$ and $\Gamma_{\alpha\beta\gamma}$ are the Christoffel symbols.

These essential physical and mathematical corrections and extensions made Dr.Santilli the completer of Einstein's gravitation theory, through the discovery of the isotopic gravitation equation in the physical vacuum: $S^{\mu\nu} \equiv R^{\mu\nu} - (1/2)g^{\mu\nu}R + (1/2)g^{\mu\nu}\Theta = \kappa(F^{\mu\nu} + T_{EM}{}^{\mu\nu})$. Within this frame, I can not go into the details of Dr.Santilli's derivation of the tensors $F^{\mu\nu}$ and $T_{EM}{}^{\mu\nu}$ for the general case when the space between the gravitating bodies is filled with ordinary and/or hadronic media.

(b) Santilli's Gravitation Theory in iso-Minkowskian Flat Space [6,7,6].* Recent studies by Dr.Santilli and other physicists established that the existence of a large number of problematic aspects of the GTR is in actuality due to the *use of Riemannian (curved) geometry* in Einstein's field equations, i.e., to the notion of curvature of space-time. These problems include: impossibility to achieve a consistent quantization in spite of numerous attempts by qualified physicists throughout most of this century; and infeasibility to include gravitation in a unified field theory of electromagnetic and weak interactions in spite of several attempts in the past five decades.

Dr.Santilli discovered that Einstein's gravitation theory in Riemannian space does not preserve the units of length and time in general transformations, and then proved that any gravitation theory based on a curved 4-dimensional space has these fundamental deficiencies. This means that theories in curved space-time can not describe gravitation experiments, i.e., have no physical meaning, since measurements require invariant units of length and time.

In view of these difficulties, Dr.Santilli conceived a new theory of gravitation which preserves the conventional metric but is presented in the iso-Minkowskian space instead in the Riemannian space. By conception, his theory eliminates the curvature of space-time via the mechanism of isotopy (in essence, the curvature of Einsteinian space-time is removed by an inverse generalization of the space-time unit).

The elimination of the space-time curvature and the replacement of the Riemannian with the iso-Minkowskian geometry permitted Dr.Santilli to formulate a general theory of gravitation the quantitative predictions of which are directly comparable with data from gravitation experiments. In particular, this theory quantitatively describes the following crucial experiments: (i) gravitational deflection of light rays; (j) precession of planetary

Einsteinian relativities, Santilli iso-grand-unification theory; Santilli iso-spin, Santilli iso-angular momentum, Santilli iso-Doppler law, Santilli iso-red shifts, Santilli iso-blue shifts; Santilli isotopic generalization of Lie's group theory, Santilli transformation groups; Santilli isotopic spaces, Santilli isodual iso-Lorentz symmetry, Santilli iso-Poincaré symmetry, Santilli isodual iso-uncertainties, Santilli iso-superposition principle, Santilli iso-symplectic quantization, Santilli iso-commutation relations, Kalnay-Santilli theorem; Santilli isotopic geometries, Santilli isotopic and isodual Minkowskian geometries, Santilli iso-Hilbert space; Santilli isolocal realism, Santilli iso-mass-normalization.

Dr.Santilli's research was supported in the U.S.A. by the National Aeronautics and Space Administration (when at the University of Florida), the National Science Foundation (when at Boston University), and the Department of Energy (when at Harvard University).

Dr.Santilli organized several international conferences and workshops in the U.S.A., Europe, Russia, and China.

Dr.Santilli founded, and manages the editorial and financial organization of, three scientific journals (Hadronic Journal; Hadronic Journal Supplement; Algebras, Groups and Geometries), which are now well established. He is the Editor of over 30 scientific conference proceedings and collections of articles.

Dr.Santilli built up and heads the Institute for Basic Research, which has more than 150 member-scientists from various regions of the world.

Dr.Santilli appeared as an invited speaker on (i) numerous national and international conferences and (ii) several scientific TV programs in the U.S.A. and Europe.

In judging my preceding evaluations of Dr.Santilli's major contributions to physics, it should be noted that his scientific productivity has provided such a wealth of novel physical knowledge and understanding that probably not a single researcher exists who has an adequate comprehension of all his achievements in physics. I did not discuss many other significant contributions (e.g., Dr.Santilli's isotopic theories of quantum gravity and anti-gravity) since I am not sufficiently familiar with them. For these reasons, my justifications for this Nomination are selective, i.e., do not give a complete picture of Dr.Santilli's scientific accomplishments.

In particular, I did not adequately evaluate Dr.Santilli's monumental contributions to mathematics. In this connection, it is unfortunate that a Nobel Prize is not awarded for mathematics, the sole *exact* science, which forms the quantitative and logical basis for all natural sciences, as well as applied physics and engineering.

Dr.Santilli established a hadronic generalization of classical mechanics, quantum mechanics, and gravitation theory, at a level of physical reality and technical importance unprecedented in the history of physics. A full appreciation of Dr.Santilli's life-work will probably not be achieved until hadronic physics has been successfully applied to the orbits; (k) rates of clocks in gravity fields; gravitational shift of spectral lines. At present, the experimental data from gravitational waves, neutron stars, and black holes are so insufficient and incomplete that comparisons with this theory can not yet be made.

In this connection, Dr.Santilli's Doppler shift theory for electromagnetic waves undergoing red or blue shifts in the presence of gravitational fields and dense ordinary or hadronic (inhomogeneous and anisotropic) media is very remarkable. The latter theory explains quantitatively the anomalous Doppler shifts observed in the chromospheres of some quasars [6,6*].

(c) Santilli's Quantum Gravity and Grand Unification Theory [6,7]. The new approach to the gravitation problem led Dr.Santilli to: (i) a novel quantization of gravity via the generalization of the space-time unit of relativistic quantum mechanics, and (ii) the initiation of new methods in grand unification theory with the inclusion of gravitation. These finally allowed Dr.Santilli to formulate a unified theory of gravitation and electroweak interactions for matter as well as antimatter, both in vacuum and in the presence of ordinary and hadronic media [7]. Comparisons of this theory with experiments are still pending.

Dr.Santilli made several significant applications of his novel gravitation equations, of which I can discuss here only a few. Considering extended wave packets and charge distributions of hadrons in short-range interactions and interpenetrations, Dr.Santilli analyzed (i) gravitational collapse of black holes and (ii) super-novae explosions (all interior problems) and, thus, demonstrated that the previous theories (based on Einstein's GTR) of these cosmic phenomena are unrealistic and physically misleading. *In particular, the physically impossible Penrose singularities do not exist in Dr.Santilli's gravitation theory. Nor do the concepts of space and time lose their physical (measurable) meaning in the presence of extreme gravitational fields.*

Finally, Dr.Santilli showed recently (still unpublished) that a physically equivalent gravitation theory can be formulated even in an iso-Galilean space-time. Thus, he demonstrated that (i) the orthodox curved space-time for gravitation theory is a mathematical space and (ii) the widespread belief that Einstein's space-time is curved in a physical sense in the presence of gravitating masses is without physical basis.

5. Santilli's International Scientific Recognition. Dr. Santilli is internationally recognized for developing (i) the foundations of *hadronic* classical, quantum, nuclear, and gravitation physics and (ii) the associated mathematical methods, transformations, algebras, groups, and differential geometries. These unique and important contributions to physics and mathematics carry his name, e.g: Santilli hadronic mechanics, Santilli iso-Heisenberg equations, Santilli iso-Schroedinger equation, Santilli iso-Dirac equation, Santilli iso-Klein-Gordon equation, Santilli hadronic gravitation theory, Santilli-Lie isotopic generalizations of Galilean and *'unsolvable' many-body-problems posed by (i) dense, highly nonideal gases, plasmas, liquids, and in particular (ii) plastic media and solids. However, this may be only a matter of some years in view of Dr.Santilli's solutions of the many-body-problems of Bose-Einstein condensation and the atomic nucleus.*

Also as a human being, Dr.Santilli is an outstanding personality, which revealed itself in his scientific battles with those 'leading physicists' who see their professional mission in the preservation of (i) the status quo in modern physics and (ii) their perceived accomplishments based on already obsolete conceptions and theories. An completely comprehensive and correct theoretical understanding of physics can be achieved only asymptotically at the end of time.

SUMMARY

For all stated reasons, it is an honor for me to nominate Prof. R.M.Santilli, who has gone beyond the greatest theoretical physicists of his times including Schroedinger, Dirac, and Einstein and who ranks with Bernhard Riemann (Santilli differential geometries) and Sophus Lie (Santilli transformation groups) as a mathematician, for the Nobel Prize in Physics, in recognition of any one or all of the following achievements of decisive significance for physics:

I. Development of hadronic quantum mechanics and discovery of isotopic and genotopic Schroedinger, Dirac, and Klein-Gordon equations for real (extended, deformable) particles interacting through long-range forces and short-range hadronic forces.

II. Calculation of (i) the internal charge structure of hadrons (p, n) and (ii) the anomalous magnetic moments of the proton, neutron, deuteron, triton, and other few-body nuclei, in full agreement with the experimental findings, from first principles of hadronic quantum mechanics.

III. Removal of the infinities of fields and energies in quantum mechanics, quantum electrodynamics, and nuclear physics, and gravitation through the extended, deformable elementary particle realizations of hadronic quantum mechanics and hadronic gravitation theory.

IV. Santilli's Lie isotopic and Lie-admissible gravitation theory in flat space for exterior and interior problems with electromagnetic and short-range interactions for nonlinear, *nonlocal-integral, and non-Hamiltonian systems in closed-reversible and open-irreversible conditions, respectively.*

V. Santilli's unification theory for gravitation and electroweak interactions in classical and operator formulations for matter and antimatter. This appears to be the first successful unification theory.

VI. Refutation (by implication) on physical and mathematical grounds, of (i) Einstein's unrealistic special and general relativity theories and (ii) Einstein's dogma of the universal Lorentz covariance of the laws of physics, - which represent Einstein's most transitory legacy to physics.

I would be grateful if you brought this Nomination to the attention of the Members of the Nobel Committee.

Sincerely yours,

Dr.rer.nat. Horst E. Wilhelm, Prof. Emer.
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