

EXPERIMENTAL RESEARCH IN CONDENSED MATTER PHYSICS ARGUING FOR MODIFICATIONS IN MAINSTREAM CONCEPTS:

Considerations of the Significance of a Physics of Collisions, Shape and Spin, Regarding Charge as a Paradigm:
Relationship to Subtle Energy Physics and Far-from-Equilibrium Physics as well as Zero Point Energy

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ABSTRACT

Data and theory are presented herein to support the argument that in the basic building blocks of matter, and in the statistical principles of physics, spin and shape are fundamental parameters, and charge is simply a useful paradigm with no physical basis. The experimental data which we present that supports this conclusion are based on chemical and physical research during the past nine years. One of the aims of the work is to determine information that can relate to coupling to zero point energy.

Introduction

The concept of charge, dating back to the cathode ray work of J.J. Thomson, although highly useful and documented (especially in chemistry), has no physical basis, and thus is a subject to be scrutinized to extract fundamental truths. This author believes that such is best accomplished through studying spin and shape as fundamental, and charge—albeit its usefulness—as a paradigm.

This work also relates to what falls into the category of subtle energy effects, and as such we are forced to concentrate on slight variations in signals that are often barely above the level of what is conventionally referred to as noise, and may be less than two-sigma regarding the Poisson statistics, and thus arguably in some cases may even relate to zero point energy considerations. In quantum theory an oscillator that is even in its lowest state of energy has a residual zero point energy which relates to the Heisenberg uncertainty principle because that energy precludes the precise localization of position coordinates and momentum. In conventional terms, the optical oscillations of an electromagnetic field mode, caused by the external particle flux induced fluctuations of electric and magnetic fields, even in the lowest realizable vacuum state, has a zero point energy designated as $1/2$ times Planck's constant times the rotational frequency, ω , divided by 2π . Zero point energy is historically related to the low frequency modes caused by what is referred to as the Casimir force when two conducting plates are brought very close together.

If one is not alert to the potential presence of very weak signals in subtle energy effects, it is easily possible to ignore these variations and ascribe them to insufficient magnitude to be considered significant. This often requires capability of reliably detecting effects of the order of at most 0.05% of accepted values, such as the universal gravitation constant, G . In this context, we also believe that variations which have been normally ascribed to random error are, at least in part, due to real physical phenomena such as variations in gravity and its statistical characteristics, especially in that every experiment in some way involves the action of gravity on the instrumentation and sample.

Our experimental¹ and theoretical² work on the root cause of gravity has led us to postulate and embrace significant changes in the understanding of modern physics. Because some of these concepts are counter to traditional credos in physics, some mainstream journals have reflected a reluctance and recalcitrance to air these notions in open scientific forum. *Infinite Energy* and its founder, Dr. Eugene Mallove, have provided a scholarly and cerebral forum for these ideas to be aired openly for critical analysis and also to motivate further experimental work and theoretical analysis. Specifically, our work and that of others has given us reason to conclude, infer, or postulate the following¹⁻¹⁹:

a) Force, field, and potential are *not* fundamental parameters, but the net transfer of momentum is fundamental to explain natural phenomena. Thus what was considered as an axiomatic fundamental force giving rise to gravity is actually due to the transfer of net linear momentum from external particles (likely to be electron neutrinos) to nucleons, and this interaction is statistical in nature. The external particle-nucleon interaction is quantum mechanically based, and the action of gravity is quantized.¹⁹ This external particle basis for gravity implies that a comprehensive understanding of the external particle distribution can, through scattering phenomena analysis, explain the trajectory of photons and mass particles through space without invoking a space-time warping, and is capable of describing black holes and dark matter with equal or greater success as compared to General Relativity, doing so on a *physical* rather than purely mathematical basis. The fundamental relationship in nature is the conservation of momentum.

b) Measurements of weight depend upon temperature, shape, and phase of the mass that is under the influence of a gravitational interaction.^{1,3,5} Thus G , which was considered a fundamental constant, is actually a function.^{2,3}

c) The Lorentz transformations in Special Relativity depend upon the square of the velocity of the propagation of the

particle that is the cause of gravity, rather than c^2 . Even though these two velocities are essentially identical in magnitude, their physical basis is fundamentally entirely different. The mass transformation is simply a mathematical manipulation and, unlike time dilation and length contraction, does *not* arise from fundamental physical phenomena.²

d) Radioactive decay, historically associated with one of the four axiomatic forces—namely the weak force or the weak interaction—is also a consequence of the impingement of external particles (likely to be the showering muon neutrinos), or at least influenced by impinging particles, rather than an inherent intrinsic property of a nucleus.¹³⁻¹⁵ It is postulated that what has been historically referred to as the fundamental force of electromagnetism, and the fundamental strong (nuclear) force are also *not* due to forces or fields, but to external particle impingement. In the case of electromagnetism¹⁷ this particle is believed to be the tau neutrino.

e) Although conservation of momentum is a fundamental statistically based relationship in nature, the conservation of energy is not,² but is instead a useful construct for elastic collisions and for interactions that occur in periods of time longer than $\sim 1\text{ns}$.

This manuscript will give our experimental data, divided into six sections.