Digital-Analog Duality Produces Mass Reality

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Abstract

As yet no theory of quantum mass has been confirmed for the standard model of particle physics. A generalized mechanism for explaining the mass effect is introduced, in simple language, based on a resonating frequency manifestation of matter in alternatingly particle and wave states. In this explanation, the concept of complementarity, that a phenomenon can be viewed in one way or in another, but not both simultaneously, directly applies to particle-wave states because they do not simultaneously coexist. In this context, the particle state can be considered to be the digital modal manifestation of matter, whereas the wave state is its analog manifestation.

1. Introduction

Quantum mass and gravitation have typically been considered to be a fundamental interaction of elementary particles, similar to the three other fundamental forces. However, gravitation has unique qualities. Its effects are analytically described in general relativity as a curvature, or deformation, of spacetime. These effects are produced by vague interactions between material mass and external spacetime, described by a system of mathematical dimensional coordinates.

What is most fundamental in this description of gravitational effects is that they are functionally equivalent to velocity imparted to material objects within a gravitational field of external spacetime that is locally directed to an immediate center of collective mass.

The effect of mass will be generally described here as an external potential energy field produced by mechanical reconfiguration occurring during the physical transition between digital quantum particle and analog wave state manifestations of elementary particles.

2. Physically Reconfiguring Emission Energy

Elementary particles are initially emitted as self-propagating waves. The zero rest mass photon exists in a perpetual wave state, producing its continuous linear traversal of spacetime until its momentum is materially absorbed, manifesting in a stationary particle state. Other particle types more frequently manifest as particles than waves, proportionately exhibiting mass characteristics.

What happens to the wave state kinetic energy required for self-propagation when matter is materialized in its particle state? The simplest answer is that it must be retained, since it will

again be manifested in its self-propagating wave state. Likewise, where does the potential energy of mass exhibited by particles come from? The simplest answer is that mass must be a mechanical conversion of emission/propagation energy, providing for its conservation.

While the kinetic energy of propagation is linearly directed, mass does not produce propagation – in fact it inhibits acceleration from the application of additional external kinetic energy. A directional reconfiguration of linearly directed kinetic energy could produce the non-propagating, motion inhibiting characteristic effects of mass.

3. The initial Acquisition of Mass

The Higgs Mechanism, recognizing that some types of particles exhibit mass characteristics more than others, introduces a conceptual particle selection field to somehow filter particles that will not be acquiring mass. No physical basis for this particle selection function is specified.

A better candidate particle selection function existed in the early universe in the form of thermal density, as the density of the initial universe temporally diminished with cooling and expansion.

In the initial universe, particles may have been directionally emitted as energy waves, or condensed from unified energy, but initial thermal density would likely have prevented both wave propagation and its reabsorption. It this localized particle state, the linearly directed kinetic energy of emission and propagation may likely have had to envelope the now stationary material energy, perhaps radially directed or spinning at its periphery. This now directionally neutralized reconfiguration of linear kinetic emission energy effectively becomes the potential energy of mass. The emitted self-propagating wave is now a stationary (spinning) discrete particle.

As the thermal density of the universe was diminished by uncondensed kinetic energy expanding to produce the enveloping universal spacetime, emitted waves were more likely to be able to propagate prior to being obstructed, producing particle manifestations. As a result, matter with varying frequencies of resonation between particle and wave states are produced as a function of temporal thermal density in the developing universe. Eventually, the momentum of obstructed waves could be materially reabsorbed, producing effectively perpetual zero rest mass photons.

4. Resonating Propagation and Mass Manifestations

Photons then, have no rest mass because they are never really at rest: they are perpetually self-propagating unless they are terminally detected as a discrete, stationary particle. More massive types of particles are those that more frequently manifest in their particle state, with their wave propagation kinetic energy reconfigured as the directionally neutralized potential energy of mass.

External application of linear kinetic energy affects matter differently depending on its particle-wave manifestation state. In its wave state, the application of linearly directed external kinetic energy produces acceleration and linear motion. In its particle state, the application of external energy is simply absorbed by the external field of directionally neutralized potential energy, increasing effective mass and increasing the amount of kinetic energy necessary to produce additional motion.

5. Particle Motion

The observed characteristic quivering or wiggling motion of particles can be easily explained by this resonation frequency of particle-wave state manifestations. As matter manifests in its wave state, it linearly self-propagates. As matter manifests in is particle state, it becomes stationary but it also spins. When matter again manifests in its wave state, it self-propagates in the new direction determined by its preceding particle state spin. The net effect of this particle-wave sequential state manifestation is the observed apparently randomly directed wiggling motion.

6. Particle Collider Detection of Mass

Particle collider experiments accelerate particles to extreme velocities to produce high energy collisions. The products of these experiments are a shower of unstable residual particles presumed to be components of the collided particles. Their trajectories and momentum are observed by experimental particle detectors.

Since in this particle-wave resonating state scenario mass is not properly a characteristic property of particles, there is no mediating particle to detect - only the effects of energy dispersal. The dissipation of potentially containing mass energy may actually allow for particle disintegration.

The residual particles' momentum and trajectories are produced by the velocity imparted to the collision subject particles and their mass. It may be that the identified Generation II and III Fermions distinguished solely by their increased masses, derived from momentum, are actually artifacts of increased experimental collision velocity in conjunction with standard particle mass.

7. Conclusion

These necessarily simple initial descriptions of a physical mechanism for producing the mass characteristics of matter from emission/propagation energy and the resonation of particle-wave state manifestation better explain observed phenomena than any existing hypothesis. While no testable hypothesis can be presented here, it is hoped that some additional investigations by more capable researchers can produce a complete theory of mass from these conceptual descriptions.