Contribution ID: **85** Type: **talk**

Space-Time Conjunction

Wednesday, 14 July 2021 16:15 (15 minutes)

Rather than view time as one of four dimensions in space-time, we start with the assumption that time is best described in a three dimensional domain of its own, defined by spherical coordinates, and is "linked to"the spatial domain, defined by orthogonal Cartesian coordinates. The result is a six-dimensional structure that is simple to visualize and define geometrically. We will refer to it as Space-Time Conjunction, as opposed to the more common term –Space-Time Continuum.

The spatial domain is the structure of mass and the time domain is the structure of energy. In theory they can exist separately but whenever energy is associated with mass the two domains are functionally joined – Space-Time Conjunction.

Transitions between the two domains occur in accordance with the laws of physics and several paradoxes can be understood. One in particular is the behavior of electrons. Under non-stressed conditions electrons can be described by Schrodinger functions in the spatial domain but when the stress of an electric field is applied they transition to the time domain until the stress is removed.

Relativistic behavior can be properly analyzed, but only if we recognize that the term "reference frame"is not accurate. It cannot mathematically exist as a three-dimensional concept. Reference can only refer to a single point, which represents the common point of origin of a unique conjunction of a spatial domain reference and time domain reference, in order to serve this purpose. The consequence is that we must then use "reference points"to analyze relativistic motion. Relativity paradoxes vanish as if by magic.

Besides the six-dimensional structure, one, and only one, empirical assumption is included in this model. Previously, electric charge has been defined only by the measurement of the force it exerts. That does not quite define the basic nature of electric charge. We can remedy that problem if we modify one constraint traditionally placed on solutions to Schrodinger's equations.

We are removing the conventional constraint that the Schrodinger wave function must establish continuity across the particle boundary by reducing to zero magnitude at that boundary.

Instead, we assume or postulate a single-magnitude, discrete, wave function magnitude at the particle boundary. Mathematically speaking the wave function changes its form but still satisfies the continuity requirement. It simply transitions to an evanescent wave function outside the boundary of the particle.

We can refer to this as a time discontinuity that, by nature of exponential decay of the evanescent wave, exists in a small fringe region about the particle. If we establish this discontinuity in the wave function at multiple of one-third pi, we produce single-valued positive and negative charge. By consequence, it also incorporates the definition of spin. It is also compatible with the quark structure of particle physics.

In summary, we may now have a physical definition of electric charge. Furthermore, we show that analyses using this space-time geometry and the definition of charge even allow us to characterize magnetic and nuclear binding forces into a unified theory.

Are you are a member of the APS Division of Particles and Fields?

No

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Session Classification: Beyond Standard Model

Track Classification: Beyond Standard Model Physics