

On the Origin of Physical Fields.

By Ir J.A.J. van Leunen

Retired physicist & software researcher

Location: Asten, the Netherlands

Website: <http://www.crypts-of-physics.eu/>

Communicate your comments to info at that site.

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Abstract

Physical fields form the solution of nature for the problem that the set of observations is overwhelming the set of underlying variables.

The origin of physical fields.

The Hilbert book model is a simple model of physics that is strictly based on traditional quantum logic and on the lattice isomorphic model; the set of subspaces of an infinite dimensional separable Hilbert space for which the inner product is specified by using quaternions¹.

This restriction results in the fact that all sets of variables are countable. At the same time most observations are taken from a continuum. As a result the set of potential observations overwhelms the set of variables². The situation is comparable to the situation in which the number of equations is far larger than the number of variables that should form the result. Probably, the set of equations will appear to be inconsistent. In order to cure the situation, it is common to assume that the observations are inaccurate. The inaccuracy must be stochastic or with other words the observation result must be blurred.

Nature applies a similar solution, but instead of a simple spread function in the form of a probability density distribution, nature applies a quaternionic probability amplitude distribution (QPAD). This QPAD can be split into a real part that represents a "charge" density distribution and an imaginary part that represents a corresponding "current" density distribution. The "charge" represents the set of properties of the thing that is being observed. The parameter of the distribution represents the location at which the "charge" is observed. The squared modulus of the QPAD represents the probability density of the presence of the "charge" at the location that is specified by the parameter.

¹ See: <http://www.crypts-of-physics.eu/HilbertBookModelEssentials.pdf>

² A continuum has a higher cardinality than a countable set.

This approach transfers the dynamics of the observation into a streaming problem. The equation of motion of the “charge” becomes a continuity equation³.

The properties of particles move according to the above principle. With each elementary particle belong one or more QPAD’s that act as private fields of the particle and that determine its dynamic behavior when it moves freely. However, these fields overlap. In this way these fields and the corresponding particles interact.

A subset of the elementary particles is massless. These particles correspond to a single QPAD. That does not say that their fields cannot overlap.

All other elementary particles are identified by an ordered pair of QPAD’s that are two field sign flavors of the same base field. The coordinate system, whose values are used as field parameter, has its own field sign flavor and acts as a sign flavor reference.

All physical fields, except the gravitation field, are superpositions of QPAD’s.

The massive elementary particles correspond to two shearing QPAD’s, which are sign flavors of the same base field. This combination is capable of generating a geo-cavity at the center location of the particle⁴.

The gravitation field is caused by geo-cavities.

Nothing exists in universe, but QPAD’s and geo-cavities.

³ Another name for “continuity equation” is “balance equation”.

⁴ See: <http://www.crypts-of-physics.eu/OriginOfMass.pdf>