

Extending QED to Interactions of the Full Eight-Component Vacuum Wavefunction of the Geometric Representation of Clifford Algebra

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Clifford algebra is the math language of quantum mechanics, known to most physicists in the matrix representations of Pauli and Dirac. Less familiar (but far more intuitive) is the original geometric intent of Clifford, the algebra of interactions of fundamental geometric objects - point, line, plane, and volume elements. In geometric representation, the 3D vacuum wavefunction is comprised of one scalar point, three vector line elements (orientational degrees of freedom), three bivector area elements, and one trivector volume element. Various combinations of the four fundamental constants that define the dimensionless electromagnetic coupling constant alpha (speed of light, permittivity of space, electric charge quantum and angular momentum quantum) permit assigning geometrically and topologically appropriate electric and magnetic flux quanta to the eight wavefunction components, increasing 'dimensionality' of the model to the ten degrees of freedom of string theory. Time (quantum phase) emerges from wavefunction interactions, in the dimension-increasing property of Clifford algebra wedge products. Such a 6D Yang-Mills model is naturally gauge invariant, finite, confined, asymptotically free, background independent, and contains the four forces [1,2].

[1]https://www.researchgate.net/publication/335240613_Naturalness_begets_Naturalness_An_Emergent_Definition

[2]https://www.researchgate.net/publication/335976209_Naturalness_Revisited_Spacetime_Spacephase

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