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Electromagnetic Foundation of Dirac Theory EM Foundation of Quantum Theory

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abstract The dynamics of classical charges subject to a particular variant of electromagnetic direct particle interaction are shown to derive from a homogeneous differential equation in a Clifford multivector. Under appropriate conditions the multivector can be factorized to give a Dirac Equation whose bi-spinor operands are eigenvectors of the multivector, thereby giving a classical electromagnetic basis for the Dirac Equation.

The Clifford multivector is an ensemble of vector and bi-vector contributions from the potential and Faraday of the auxiliary (adjunct) fields of direct particle interaction, each member generated by a unique current. The presumption of light-speed motion of the charge generates non-linear constraints on these fields. These conditions are shown to be responsible for the otherwise enigmatic eigenvalue selection / wavefunction collapse behavior characteristic of Dirac bi-spinors.

Though time-symmetric adjunct fields are intrinsic to the direct particle action paradigm, their elimination has been the main focus of previous work in this field in order to conform with Maxwell field theory. By contrast, this work presents the time-symmetric fields as the foundation of Dirac bi-spinors. Even so, accidentally we discover a novel explanation of the emergence of exclusively retarded radiation from the direct action paradigm that makes no appeal to special boundary conditions.

Quantum Theory & $DiracsEquation$ & $CliffordAlgebra$ & $directparticleinteraction$ & $action-at-a-distance$ & $time-symmetry$ & $Majoranaspinors$ & $darkenergy$ & $super-symmetry 03.50.-z$ & $03.50.De$ & $03.50.Kk$ & $03.65.-w$ & $03.65.pm$ & $03.65.Ta$ & $11.10.-z$ & $11.15.Kc$ & $11.30.Pb$ & $11.09.+t$ & $12.90.+b$ & $14.60.Cd$ & $4.70.Bh$ & $11.30.Pb$ & $95.36.+x 81P99$ & $81Q65$