Dirac Equation for Electrodynamic Model Particle

J.X. ZHENG-JOHANSSON, IOFPR

— We set up the Maxwell’s equations and subsequently the classical wave equations for the electromagnetic waves which together with their generating source, an oscillatory charge of zero rest mass, make up a particle travelling at velocity $v$ as with the charge in the fields of an external scalar and vector potentials. The direct solutions in constant external field are Doppler-displaced plane waves propagating at the velocity of light $c$; at the de Broglie wavelength scale and expressed in terms of the dynamically equivalent and appropriate geometric mean wave variables, these render as functions identical to the space-time functions of the Dirac spinor, and these are identical to the de Broglie phase waves given previously from explicit superposition. For two spin-half particles of a common set of space-time functions constrained with antisymmetric spin functions as follows the Pauli principle for same charges and as separately indirectly induced based on experiment for opposite charges, the complete wave functions are identical to a Dirac spinor. The back-substitution of the so explicitly determined complete wave functions in the corresponding classical wave equations of the two particles, subjected further to reductions appropriate for the stationary-state particle motion and to rotation invariance when in three dimensions, give a Dirac equation set; the procedure and conclusion are directly extendible to arbitrarily varying potentials by use of the Furious theorem and to three dimensions (full paper: QTS5).