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Conserved Currents, their Excitations, Fields, and Masses D.F. SCOFIELD, Dept. Physics, Oklahoma State University — Three inequivalent Maxwell-Dirac-like systems of equations are derived from the differential geometric and dynamical structure imposed by the conservation of currents and their excitations defined over a spacetime. In this geometric derivation of quantum mechanics, only one of the three systems (the standard Maxwell-Dirac system) has a physical interpretation in present theoretical models. The other two describe new leptonic quasi-particles, fields belonging to different leptonic mass-symmetry representations. These results have implications for the existence of non-symmetry breaking mass parametrization in the Standard Model of electroweak interactions as well as for the existence of dark matter. In deriving these results, it is first shown that all conserved currents satisfy second order vector wave equations. This allows one to show that all conserved currents and their excitations defined over a spacetime have quantal, wave-mode descriptions with states labeled by "theoretical mass-parameters" regardless of spatial scale, thereby unifying their classical and quantum geometrodynamics.

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