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Three arguable concepts: point particle singularity, asymmetric action of EM on quantum wave functions, and the Left out restricted Lorentz gauge from U(1)*

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We address three concepts. i. The point particle assumption inherent to non-quantum physics is singular and entails divergent fields and integrals. ii. In quantum physics electromagnetism (EM) plays an asymmetric role. It acts on quantum wave fields (wave functions) but the wave fields do not react back. We suggest to promote the one sided action of EM on quantum waves into a mutual action-reaction partnership. By so doing, the quantum wave shares its analyticity with the EM field and removes the latter's singularities and divergences. iii) The conventional U(1) symmetry leaves quantum dynamics invariant under a 'general' Lorentz gauge and imposes the standard minimal coupling of the quantum wave to the EM 4-vector potential. One, however, has the option to ask for invariance under the 'restricted' Lorentz gauge. This in turn invites in a coupling to the derivatives of the vector potential in addition to the minimal coupling and, so to say, enlarges the U(1) symmetry. We examine the Dirac electron in this context and find that the electron exhibits distributed charge and current densities. The enlarged symmetry is expected to bring in its own constant of motion. Indeed it does. The anomalous g-factor of the so designed electron emerges, up to order (⊠/⊠)^2 as the new constant of motion in agreement with the QED theorized values.

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