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A theory for Dark Energy based upon the Born self-energy for a finite-sized electron BRUCE LAW, Kansas State University — The cosmological ΛCDM model provides a remarkable description of numerous astronomical observations related to the expansion of the Universe after the Big Bang. A deficiency of the ΛCDM model is that Dark Energy or, equivalently, the cosmological constant Λ is merely an adjustable parameter with no explanation for either its magnitude or its physical properties. In this contribution we describe the cosmological consequences of the Born self-energy, associated with the electric field, which surrounds a finite-sized electron. In the current formulation of QED mass renormalization implies that energy is not conserved for a classical electron. A necessary condition, which restores energy conservation, is that the Born self-energy be added to the rest mass energy of the electron. It is found that this Born self-energy, for a finite-sized electron, reproduces many of the features attributed to Dark Energy including its magnitude, the equation of state, as well as, the observed acceleration-deceleration transition at a red-shift of approximately 0.8. Further details about this model can be found in Astrophys. Space Sci. 365:64 (2020).

Bruce Law
Kansas State University

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