Abstract Submitted
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Origin of Planck's Constant in Galilean Relativity[1] JOHN FRY, ZDZISLAW MUSIELAK, University of Texas at Arlington — In recent papers [1,2] the authors demonstrated that scalar waves in Galilean relativity must satisfy a unique Schrödinger-like equation characterized by a "mass-like" parameter M, but not including Planck's constant as found in Schrödinger's original equation. In this paper we show that a constant like Planck's constant is needed for a Newtonian observer to relate the wave parameter M to the classical mass M_C, a quantity which he can measure conveniently. This process also relates a classical potential to an interaction term in the Galilean wave equation and reveals the need for a constant like Planck's constant. We point out that Planck's constant is not unique in Galilean relativity and suggest that for certain potentials or elementary particles other values could occur. Consequences of the existence of other values of Planck's constant are discussed, and an unusual idea based on this possibility is presented as a possible explanation of dark matter. References: [1] Z.E. Musielak and J.L. Fry, Ann. Phys. 324 (2009) 296; [2] Z.E. Musielak and J.L. Fry, Int. J. Theor. Phys., in press (2009) DOI: 10.1007/s10773-008-9893-9.

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