

Abstract Submitted
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Quantum Mechanics Without Planck's Constant JOHN RALSTON,
University of Kansas — Planck's constant was introduced as a fundamental unit in the early history of quantum mechanics. We find a modern approach where Planck's constant is absent: It is unobservable except as a constant of human convention. Despite long reference to experiment, review shows that Planck's constant cannot be obtained from the data of Ryberg, Davisson and Germer, Compton, or that used by Planck himself. In the new approach Planck's constant is tied to macroscopic conventions of Newtonian origin, which are dispensable. The precision of other fundamental constants is substantially improved by eliminating Planck's constant. The electron mass is determined about 67 times more precisely, and the unit of electric charge determined 139 times more precisely. Improvement in the experimental value of the fine structure constant allows new types of experiment to be compared towards finding “new physics.” The long-standing goal of eliminating reliance on the artifact known as the International Prototype Kilogram can be accomplished to assist progress in fundamental physics.

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