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Classical interpretation of quantum phenomena

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As an introductory remark it is clarified that in this paper the term "classical physics", refers exclusively to Newton´s and Maxwell equations, and does not consider special or general relativity. In the first part of this work it is shown, that the well-known claims about the ineptitude of classical physics in the microscopic domain are false, by giving simple classical interpretations for the photoelectric effect, the Compton effect the radiated spectra of the hydrogen atom and Planck´s radiation law. It is concluded that the falsehood of the previous claims, is merely a necessary – but not a sufficient–condition for the applicability of classical physics to quantum phenomena. In the second part of this work, a formal classical theory for the stable (force-free) extended particle is developed, which by considering electromagnetic and gravitational forces, leads to a nonlinear equation for the electric, magnetic and gravitational potentials. Some solutions of the basic equations for unbounded media are presented. The boundary value problem for the isolated elementary particle is formulated, and the numerical and analytical techniques that are currently being applied, in an attempt to find a solution in toroidal coordinates by successive over relaxation methods, are reviewed. It is concluded that the solution of this boundary value problem is crucial to determine the applicability of classical physics to quantum phenomena. On one hand, if it can be shown that no solution exists, then this is a rigorous proof of its inapplicability. On the other hand, if a solution is found, then to be applicable, it must also predict the mass and the spin of the electron and the proton.

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