A Unified Electro-Gravity (UEG) Theory of Nature: A New Electromagnetic Theory of Gravity, and its Application to a Complete Model of the Electron

Nirod K. Das
Department of Electrical and Computer Engineering, Tandon School of Engineering
New York University, 5 Metrotech Center, Brooklyn, NY 11201, USA

A new Unified Electro-Gravity (UEG) theory of nature has been recently developed, that can self-consistently model elementary particles in the small scale, as well as astrophysical problems and cosmology in the large scale of nature. In this talk, the basic UEG theory will be introduced, where gravity is modeled as a gradient of an equivalent inverse-permittivity distribution of the empty space. This is in consistency with general relativity, as shown in a modeling of the deflection of light around a massive body. The basic theory is then generalized with a modified definition of the energy density in an electromagnetic field, resulting in an additional gravitational field dependent upon the electromagnetic energy density. The additional gravitational field can counter the self-repulsion of an elementary charge, as well as support a spinning motion of the charge, leading to a self-consistent modeling of a complete structure of an elementary charge particle. The structure having the lowest energy (mass) is recognized as the electron. The successful modeling of the electron reveals that the new UEG theory is the fundamental origin of the fine-structure constant of quantum electrodynamics, and is the physical basis of various quantum concepts such as spin, charge quantization, energy-frequency relation, wave-particle duality and the Casimir force.

Extension of the basic UEG theory to other elementary charged particles (proton) is possible by introducing a general functional dependence of the new gravitational field with energy density, and then composite charged or neutral particles can also be synthesized by having multiple charge layers. The UEG theory can be extended to astrophysical problems as well, where additional gravitational effects due to stellar light (in galaxy rotation, cosmology) or cosmic background radiation (in galaxy clusters, cosmology) would serve as physical substitutes for the hypothetical dark matter or dark energy currently invoked.

Nirod K. Das is an Associate Professor with the Electrical and Computer Engineering Department, Tandon School of Engineering, New York University. He received his B.Tech degree from Indian Institute of Technology, Kharagpur, in 1985, and the MS and PhD Degrees from University of Massachusetts at Amherst, in 1987 and 1989, respectively. Prof. Das' research interests include analytical and computational electromagnetics, antenna theory, RF/Microwave circuits, and metamaterials. His recent research is focused on the electromagnetic theory at the most fundamental level, leading to possible unification of electromagnetics with other areas of fundamental physics - particle physics, quantum mechanics, astrophysics and cosmology.