Hamiltonian Symmetry in Special Relativity and the N-Body Dirac Equation: Progress Report

FELIX T. SMITH, SRI International — At recent DAMOP, ICPEAC and ICAP meetings I have reported on the new symmetric special relativity (SSR) needed to cure a flaw in relativistic quantum dynamics responsible for the absence of an n-body Dirac equation [1]. In SSR both position and velocity space are hyperbolic. The Hubble length \( \rho(t) \) and light speed \( c \) provide standards of length and velocity and share the cosmological time-dependence, \( H(t) = c(t)/\rho(t) \). Their product is the new Hubble-Lorentz constant, \( \sigma = c(t)\rho(t) = c^2H_0^{-1} = 5 \times 10^{34} \text{m}^2/\text{s} \). The theory solves the center of mass problem and sustains an n-body Dirac equation, a fully relativistic Schrödinger equation, and a new, highly symmetrical hyperbolic Poincaré group. It provides a systematic dynamical derivation for algorithms used for center-of-mass effects like mass polarization, recoil and reduced mass in precision calculations in atomic spectroscopy. While not yet within range of detection, the idea of measuring the Hubble parameter \( H_0 \) in a local spectroscopic process can now be contemplated. The theory and its most recent results and implications will be reported. [1] F. T. Smith, Ann. Fond. L. de Broglie, to be published.

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