Presymmetry beyond the Standard Model

Friday 31 July 2009 17:30 (20 minutes)

We go beyond the Standard Model guided by presymmetry, the discrete electroweak quark-lepton symmetry hidden by topological effects which explain quark fractional charges as in condense matter physics. Partners of the particles of the Standard Model and the discrete symmetry associated with this partnership appear as manifestations of a residual presymmetry and its extension from matter to forces. This duplication of the spectrum of the Standard Model keeps spin and comes nondegenerated about the TeV scale. [Work supported by the Departamento de Investigaciones Cientificas y Tecnologicas, Universidad de Santiago de Chile, Usach.]

Summary

In this short talk, the quark-lepton charge relations which have motivated the research are presented. The hypotheses of electroweak quark-lepton symmetry and weak topological-charge confinement that account for the observed symmetry are stated. The approach, which adds to the Standard Model the new hidden states of prequarks and preleptons and the associated presymmetry, is described. In particular, the problem of gauge anomaly is addressed. Motivations to go beyond the Standard Model by duplicating in a symmetric way the particle spectrum are next given. The prime motivation is to generate a residual presymmetry in the sense of Ekstein, so avoiding the use against the model of the Occam's razor principle. In fact, presymmetry is difficult to test or refute at the level of the Standard Model. Constraints from high precision experiments provide only restrictions on the mass of the new particles. The upper bounds below 1 TeV for fermions partners raise expectations of their direct detection. The talk ends with conclusions based on results. [Refs.: E.A. Matute, Mod. Phys. Lett. A (2009), to be published; Int. J. Mod. Phys. A22, 3669 (2007); Phys. Rev. D73, 055008 (2006).]

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