Effect of Vacuum Properties on Electroweak Processes – A Theoretical Interpretation of Experiments

Harald Stumpf

Institute of Theoretical Physics, University Tuebingen, Auf der Morgenstelle 14,
D-72076 Tuebingen, Germany

Reprint requests to Prof. H. S.; E-mail: herold@tat.physik.uni-tuebingen.de

Z. Naturforsch. **63a,** 301 – 317 (2008); received November 25, 2007

Recently for discharges in fluids induced nuclear transmutations have been observed. It is our hypothesis that these reactions are due to a symmetry breaking of the electroweak vacuum by the experimental arrangement. The treatment of this hypothesis is based on the assumption that electroweak bosons, leptons and quarks possess a substructure of elementary fermionic constituents. The dynamical law of these fermionic constituents is given by a relativistically invariant nonlinear spinor field equation with local interaction, canonical quantization, selfregularization and probability interpretation. Phenomenological quantities of electroweak processes follow from the derivation of corresponding effective theories obtained by algebraic weak mapping theorems where the latter theories depend on the spinor field propagator, i. e. a vacuum expectation value. This propagator and its equation are studied for conserved and for broken discrete symmetries. For combined CP- and isospin symmetry breaking it is shown that the propagator corresponds to the experimental arrangements under consideration. The modifications of the effective electroweak theory due to this modified propagator are discussed. Based on these results a mechanism is sketched which offers a qualitative interpretation of the appearance of induced nuclear transmutations. A numerical estimate of electron capture is given.

Key words: Discharges in Fluids; Symmetry Breaking; Induced Nuclear Transitions.