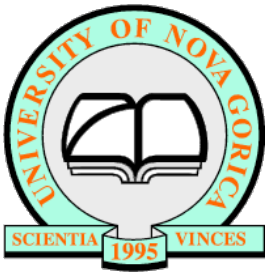

Graduate Physics Seminar
Monday, 28 February 2011 from 4 PM
University of Nova Gorica, Ajdovščina site
Auditorium

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LHC and the origin of neutrino mass

Abstract

The physics of elementary particles is almost completely governed by symmetries. One particular symmetry stands out: the one between left and right, called parity, probably the first symmetry a child sees. Its maximal breaking in beta decay created a bombshell more than fifty years ago, and ultimately led to the creation of the Standard Model of all interactions (except gravity), whose final crowning confirmation is to be provided by the Large Hadron Collider (LHC) at CERN if successful in its hunt of the Higgs particle. The Standard Model is based on the basic premise of parity being broken always, at all energies, and being broken maximally. I argue, on the contrary, that in nature left-right symmetry is fundamental, and that at the high energies of the LHC one could actually see its restoration in full glory. I show how this is connected to the nature of the neutrino, a mysterious particle that we are still probing, eighty years after its conception and more than half a century after its discovery. I have been involved in the development of the Left-Right symmetric theory from its beginning, and more recently in its role in the possible creation of electrons out of 'nothing' at the LHC, and in neutrinoless double-beta decay. An essential role in this is played by the 'seesaw' mechanism of small neutrino mass, that emerged naturally from the idea of left-right symmetry, and that hopefully could be probed at the LHC.