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Dr. RACIOPPI, Antonio (NICPB Tallin): Matter parity, scalar dark matter and LHC

Monday, 13 September 2010 17:30 (15 minutes)

We extend the concept of matter parity P_M=(-1)^{3(B-L)} to non-supersymmetric theories and argue that P_M is the natural explanation to the existence of Dark Matter (DM) of the Universe. If the underlying Grand Unified Theory gauge group is SO(10), then non-supersymmetric scalar DM must be contained in a scalar 16 representation and the unique low energy DM candidates are a P_M-odd complex scalar singlet S and an inert scalar doublet H_2. We construct a minimal matter parity DM model where DM is made by a combination of the scalar singlet S and the inert doublet H_2 and study its phenomenology at LHC. We focus on the lightest dark scalar S_{DM}, the next-to-lightest dark scalar S_{NL} and the charged Higgs H^+. S_{NL} is predicted to be long-lived, providing distinctive experimental signatures of displaced vertex of two leptons or jets plus missing transverse energy. Also H^+ can have a macroscopic decay length in a notable region in the parameter space.

Session Classification: 6 talks (Chair: Bohdan GRZADKOWSKI)