



Contribution ID: 164

Type: Talk

Grand Unification in the light of preliminary LHC hints of W_R

Thursday, July 7, 2016 2:40 PM (20 minutes)

In the LHC Run 1 CMS reported a 2.8σ excess in the $(2e)(2jets)$ channel around 2.1 TeV. We take this as a hint of the production of a right-handed weak gauge boson, W_R , of the left-right symmetric model arising from an $SO(10)$ grand unified theory. We show that a W_R with mass in the TeV region if embedded in $SO(10)$ requires $0.64 \leq g_R/g_L \leq 0.78$, when one abides by the Extended Survival Hypothesis. A unique symmetry-breaking route – the order being left-right discrete symmetry breaking first, followed by $SU(4)_C$ and finally $SU(2)_R$ – is also picked out. The $L \leftrightarrow R$ discrete symmetry must be broken around 10^{16} GeV while the GUT scale is pushed to 10^{18} GeV. So, in this model observation of proton decay in ongoing searches is unlikely. On the flip side, the $SU(4)_C$ breaking scale can be as low as 10^6 GeV so that $n - \bar{n}$ oscillation or flavour changing decays such as $K_L \rightarrow \mu e$ and $B_{d,s} \rightarrow \mu e$ may be detectable. The Higgs scalars responsible for symmetry breaking at various stages are uniquely identified so long as one adheres to a minimalist principle. We also remark on the scope of interpreting the $O(\text{TeV})$ -scale LHC Run 1 diboson and Run 2 diphoton indications within this model.

Primary author: Dr RAYCHAUDHURI, Amitava (University of Calcutta, India)

Co-authors: Dr BRAHMACHARI, Biswajoy (Vidyasagar Evening College, Kolkata, India); Mr BANDYOPADHYAY, Triparno (University of Calcutta, India)

Presenter: Dr RAYCHAUDHURI, Amitava (University of Calcutta, India)

Session Classification: Non-SUSY and Exotics

Track Classification: Non-SUSY and Exotics