

LHC Constraints on a B – L Gauge Model using Contur

Tuesday, 2 April 2019 17:05 (25 minutes)

The large and growing library of measurements from the Large Hadron Collider has significant power to constrain extensions of the Standard Model. We consider such constraints on a well-motivated model involving a gauged and spontaneously-broken B – L symmetry, within the Contur framework. The model contains an extra Higgs boson, a gauge boson, and right-handed neutrinos with Majorana masses. This new particle content implies a varied phenomenology highly dependent on the parameters of the model, very well-suited to a general study of this kind. We find that existing LHC measurements significantly constrain the model in interesting regions of parameter space. Other regions remain open, some of which are within reach of future LHC data.

Besides the particle level information of LHC measurements, displaced vertices to search for long-lived particles such as the Majorana Neutrinos in the B-L model can be complimentary to this research. Such processes mediated by the Higgs boson in the SM has been studied in particular showing an upper bound for the active-sterile neutrino mixing $V_{1N} < 10^{-7}$.

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Session Classification: Session 1