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A Baryon and Lepton Number Violation Model Testable at the LHC

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We construct an explicit example of such a model which violates baryon number by one unit, $\Delta B = -1$, and lepton number by three units, $\Delta L = -3$, and show that despite stringent limits on the predicted $p \rightarrow e^+/\mu^+ \bar{\nu}\bar{\nu}$ mode from the Super-Kamiokande experiment, the masses of the newly introduced elementary particles can be $\mathcal{O}(\text{TeV})$. We identify interesting unique signatures of baryon number violation of this model that can be probed both with currently available LHC data and with the upcoming High-Luminosity LHC. We also present a scenario for low-scale baryogenesis within the framework of this model.

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