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A search for a high-momentum high-mass neutrino in pp collisions with the ATLAS detector

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One indication that the Standard Model of particle physics is incomplete lies in the unanswered question of neutrino mass generation. Most popular among the possible explanations of this mystery is the see-saw mechanism which postulates that small neutrino masses arise from the exchange of heavy force-carriers. Additionally, a framework for this mechanism is the so-called Left-Right Symmetric Model (LRSM) which is favoured since it offers a number of advantages such as explanations for violation of parity in the Standard Model, generation of mass in both heavy and light neutrinos, and accounts for parity symmetry at high energies. This model can be analysed through studying lepton-number violation, of which the Keung-Senjanovič process is a culprit. The search herein investigates the decay of a heavy right-handed gauge boson W_R into a heavy neutrino N_R via the aforementioned process, with keen focus on regions where the gauge boson W_R is much heavier than the boosted neutrino N_R . The basis of the search is Run 2 data collected during the years 2015 to 2018, from the ATLAS detector at the Large Hadron Collider (LHC). For such a search, muon and electron channels result in different topologies; in the former, a unique method of large-radius jets containing electrons is employed.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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