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Probing Radiative Neutrino Mass Generation through Monotop Production

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We present a generalization of a model where the right-handed up-type quarks serve as messengers for neutrino mass generation and as a portal for dark matter. Within this framework the Standard Model is extended with a single Majorana neutrino, a coloured electroweak-singlet scalar and a coloured electroweak-triplet scalar. We calculate the relic abundance of dark matter and show that we can match the latest experimental results. Furthermore, the implications from the scattering between nuclei and the dark matter candidate are studied and we implement the latest experimental constraints arising from flavour changing interactions, Higgs production and decay and LHC collider searches for a single jet and jets plus missing energy. In addition, we implement constraints arising from scalar top quark pair-production. We also study the production of a single top in association with missing energy and calculate the sensitivity of the LHC to the top quark hadronic and semi-leptonic decay modes with the current 20 fb^{-1} data set at a centre of mass energy of $\sqrt{s}=8 \text{ TeV}$ and carry out the analysis to centre of mass energies of $\sqrt{s}=14 \text{ TeV}$ with 30 and 300 fb^{-1} of data.

Primary authors: DE LA PUENTE, Alejandro (TRIUMF); NG, John (Unknown)

Presenter: DE LA PUENTE, Alejandro (TRIUMF)

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