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Electroweak vacuum stability from extended Higgs portal dark matter and type-I seesaw

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We investigate the electroweak vacuum stability in presence of a scalar dark matter and neutrino mass model through type-I seesaw. The minimal Higgs portal dark matter framework is extended here with another scalar singlet field carrying non-zero vacuum expectation value. Our results reveal that inclusion of this extra scalar not only helps in achieving absolute vacuum stability (even with large neutrino Yukawa coupling) of the electroweak vacuum upto Planck scale, but also opens up the low mass window for a scalar dark matter (< 500 GeV) which otherwise was excluded from recent XENON 1T data.

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