

COLLIDER SIGNATURES OF SNEUTRINO DARK MATTER IN LEFT-RIGHT SUPERSYMMETRY

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A right-handed sneutrino is a viable dark matter candidate in supersymmetry in addition to the more conventional neutralino option. Right-handed (s)neutrinos are a natural part of left-right symmetric models, where the gauge sector is extended with right-handed weak interactions. In left-right supersymmetry right-handed (s)neutrinos are a part of a doublet and they have gauge interactions.

We found that we may satisfy the constraints from relic density, low-energy observables and direct SUSY searches with a right-handed sneutrino LSP. If the right-handed sneutrino is the LSP it will annihilate dominantly via a s-channel Higgs. The coupling comes from D-terms, *i.e.* it is a gauge coupling. We may get the correct relic density outside resonant annihilation and without the need for left-right mixing in the sneutrino sector.

We studied the possibility of finding supersymmetry through the right-handed gauge sector. If W_R can decay to sleptons, this will often lead to final states with hard leptons and missing transverse energy. We compare some benchmarks with sneutrino LSP to the case of a neutralino LSP. If the W_R mass is less than 3 TeV, we may discover supersymmetry in the dilepton mode with 100 fb^{-1} . We also discuss means of distinguishing sneutrino and neutralino LSPs [1].

[1] M. Frank, B. Fuks, K. Huitu, S. K. Rai and H. Waltari, HIP preprint HIP-2017-01/TH.