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Right-handed sneutrino dark matter in the mSUGRA

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In this talk, we will discuss the prospects of a simple extension of the minimal supergravity (mSUGRA) model to which we add three generations of right handed neutrinos (sneutrinos). The neutrino masses are assumed to be of a purely Dirac nature. In this framework, the right-handed sneutrino becomes the cold dark matter candidate (CDM) of the universe. We consider the production of the right-handed sneutrino by decays of the stau_1 , viz., the NLSP in our scenario. We consider constraints on the decay of the stau_1 from big-bang nucleosynthesis (BBN) and see that this serves as one of the strongest constraints by restricting its lifetime from a few seconds to a few hundred seconds. In this regard, we utilize the latest constraints from 4-He and D/H. Besides, we also constrain the mass of the stau_1 from the search for long-lived particles at the run-I of the LHC. Geared with all these constraints, we study the prospects of probing the remaining parameter space of the model at the high luminosity run of the LHC at 14 TeV.

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