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Mixed-sneutrino dark matter at the LHC

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In supersymmetric theories with right-handed neutrinos, new possibilities open up for dark matter. I will discuss a scenario in which right-handed sneutrinos with weak-scale masses mix with left-handed sneutrinos through weak-scale A terms. In this case the lightest sneutrino mass eigenstate is a viable dark matter candidate. After discussing the constraints on this model from requiring the correct relic abundance and from direct-detection experiments, I will present an analysis of signatures of this scenario at the LHC. The NLSP typically decays promptly, so the phenomenology is distinct from the recently studied case where the LSP sneutrino is almost entirely right-handed. Possible signatures include dileptons with a rather unusual invariant mass distribution, from cascades involving the decay of the lightest neutralino, and Higgs or Z bosons from the decays of the heavier sneutrinos to the lighter ones, produced in association with leptons.

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