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Leptogenesis and light DM in the Scotogenic Model

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This talk is based on arXiv:1806.06864.

We will present an extension of the Standard Model, including three right-handed neutrinos N_i and a new Higgs doublet Σ, all charged under a exact Z_2 parity symmetry. This framework is also known as the "Scotogenic model".
We will discuss how one can realize the SM neutrino masses + mixing angles and also generate the observed DM density and the baryon asymmetry of the universe (BAU) in this model framework. The DM is supposed to be a keV right-handed neutrino which is mainly produced via a freeze-in mechanism given by decays of the new scalars. The BAU is generated via Leptogenesis, which relies on two CP violating mechanisms:

1) Oscillations among the RH neutrinos

2) Heavy scalar decays $\Sigma \to NL$

Combining everything, we found a quite constraint parameter region which places an upper bound on the allowed DM mass of $\mathcal{O}(20)$ keV at most.

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