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FIMP dark matter in the scotogenic model at low-reheating temperatures

The scotogenic model offers an attractive framework that explains light neutrino masses while accommodating a viable dark matter candidate. In this work, we study the phenomenology of singlet fermion dark matter, N_1 , produced via the freeze-in mechanism characterized by an instantaneous low reheating temperature, T_{rh} . We explore the model's viable parameter space, incorporating current bounds from lepton flavor violation ($\mu \rightarrow e\gamma$) and direct detection limits. We show that low-reheating scenarios significantly reshape the viable region for N_1 dark matter, improving prospects for testing the scotogenic model in the FIMP scenario while keeping it consistent with current lepton flavor violation and cosmological bounds.

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