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Majorons Revisited: light dark matter as FIMP

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We show that Majoron, the pseudo-Nambu-Goldstone boson resulting from the spontaneous breaking of global lepton number symmetry, can present itself as a viable freeze-in type of dark matter in a mass range keV-GeV, thanks to the explicit higher dimensional Lepton number breaking operator. Interestingly, the proposal is restricted within the simplest extension of the Standard Model with two singlet right-handed neutrinos and a singlet scalar so to address light neutrino mass and spontaneous breaking of lepton number symmetry respectively. The desired amount of Majoron production takes place from the annihilations of right-handed neutrinos indicating an intriguing connection between neutrino physics and dark matter.

Designation

Student

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