

A model of pseudo-Nambu–Goldstone dark matter with two complex scalars

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Within the WIMP paradigm, a Higgs-portal DM that interacts with SM particles through Higgs-portal interaction is a simple and testable scenario. On the other hand, such models are severely constrained by DM direct detection experiments. It is not easy to avoid the constraint maintaining the correct DM relic abundance unless the DM mass is fine-tuned to be around the resonance. Recently, pseudo-Nambu-Goldstone DM (pNG DM) has been proposed to cure this double bind. It has an interesting property that it can easily suppress the spin-independent cross section with nucleon in the direct detection experiments keeping the DM abundance thanks to the low-energy theorem. In this talk we propose a new pNG DM model consisting of two SM-singlet complex scalars charged under dark U(1) gauge symmetry, which easily evades all existing constraints and explains the DM abundance by freeze-out mechanism. Our model contains several merits compared to the original pNG DM model and other variants; no domain-wall problem, no Landau pole, and DM is absolutely stabilized by Z2 symmetry.

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