

An update on the two singlet Dark Matter model

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We revisit the two real singlet extension of the Standard Model with a $Z_2 \times Z'_2$ symmetry. One of the singlet scalars S_2 , by virtue of an unbroken Z'_2 symmetry, plays the role of a stable dark matter candidate. The other scalar S_1 , with spontaneously broken Z_2 -symmetry, mixes with the SM Higgs boson and acts as the scalar mediator. We analyze the model by putting in the entire set of theoretical and recent experimental constraints. The latest bounds from direct detection Xenon1T experiment severely restricts the allowed region of parameter space of couplings. To ensure the dark matter satisfies the relic abundance criterion, we rely on the Breit-Wigner enhanced annihilation cross-section. Further, we study the viability of explaining the observed gamma-ray excess in the galactic center in this model with a dark matter of mass in the $\sim 36 - 51$ GeV window and present our conclusions.

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