

# Fermion Singlet Dark Matter in a Pseudoscalar Dark Matter Portal

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## Introduction

We explore a simple extension to the Standard Model containing two gauge singlets: a Dirac fermion and a real pseudoscalar. In some regions of the parameter space both singlets are stable without the necessity of additional symmetries, then becoming a possible two-component dark matter model. We study the relic abundance production via freeze-out, with the latter determined by annihilations, conversions and semi-annihilations. Experimental constraints from invisible Higgs decay, dark matter relic abundance and direct/indirect detection are studied. We found three viable regions of the parameter space, and the model is sensitive to indirect searches. A related model is studied with dynamical masses for the DM sector from a chiral symmetry breaking, with kinetic mixing of scalar masses for the Higgs sector

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## Referencias

[1] B. Díaz, P. Escalona, S. Norero, A. Zerwekh, Journal of High Energy Physics 2021, 233, (2021)