## Effective vector and fermion Higgs portal: A global study with GAMBIT

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We perform a global study of the effective vector and fermion Higgs portal models of dark matter (DM) using the Global And Modular Beyond-the-Standard-Model Inference Tool (GAMBIT) package. Within the effective field theory (EFT) approach, DM communicates with the Standard Model (SM) Higgs boson via an operator of the form  $\mathcal{O}_{DM}H^{\dagger}H$ . For the fermion models, we take an admixture of the scalar  $\overline{\psi}\psi$  and pseudoscalar  $\overline{\psi}i\gamma_5\psi$  interaction terms. Using a combined likelihood function which includes a contribution from the Planck measured relic density, LHC limits on the Higgs invisible width as well as the indirect and direct detection experiments, current limits are placed on each of the model parameter space. Uncertainties associated with a series of nuisance parameters such as the DM halo distribution, SM masses/couplings, and the nuclear matrix elements relevant for the calculation of direct search yields are all accounted by associating them with a corresponding likelihood term in the combined likelihood. Depending on the method chosen for statistical inference (Bayesian and/or frequentist), these nuisance parameters are integrated and/or marginalised out to yield a first set of preliminary results. From these results, we find that current DM searches significantly exclude much of the model parameter space. Further exclusion will be possible when the next generation of indirect and direct DM search experiments become operational.

## Summary

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