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Multi-component Dark Matter through a Radiative Higgs Portal

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We study a multi-component dark matter model where interactions with the Standard Model are primarily via the Higgs boson. The model contains vector-like fermions charged under $SU(2)_W \times U(1)_Y$ and under the dark gauge group, $U(1)'$. This results in two dark matter candidates. A spin-1 and a spin-1/2 candidate, which have loop and tree-level couplings to the Higgs, respectively. We explore the resulting effect on the dark matter relic abundance, while also evaluating constraints on the Higgs invisible width and from direct detection experiments. Generally, we find that this model is highly constrained when the fermionic candidate is the predominant fraction of the dark matter relic abundance.

Summary

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