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Multi-component dark matter from a hidden gauged SU(3)

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Summary

We study Dark Matter (DM) phenomenology with multiple DM species consisting of both scalar and vector DM particles.

More specifically, we study the Hidden Gauged SU(3) model of Arcadi et al. In the Hidden Gauged SU(3) model,

because of the large parameter space, we restrict ourselves to three representative benchmark points, each with multiple DM species. The relic densities for the benchmark points were found using a program developed to solve the coupled Boltzmann equations for an arbitrary number of interacting DM species with two particles in the final state. For each case, we varied the mass of the DM particles and then found the value of the dark SU(3) gauge coupling that gives the correct relic density. We found that in some sets of parameter values DM would be difficult to observe in direct detection experiments but would be easier to observe in indirect detection experiments while for other sets of parameter values the situation was reversed so that measurements from both types of experiments complement each other and could help pinpoint the details of the hidden SU(3) model.

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