

Fundamental physics in the cosmos: The early, the large and the dark Universe



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Effective Field Theory phenomenology for an extended Dark Sector

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In previous works, effective field theories (EFT) have been used to scan the relevant parameter space for single dark sector particle. We have extended upon that work to include co-annihilation as well as Sommerfeld enhancement. To this end, we have calculated solutions to the Boltzmann equation for the case of a more complex dark sector with arbitrary mass spectrum, interactions and particle spin/parity. We can readily compare the resulting relic density with the measured one to exclude a wide range of possible configurations. Further observational (indirect dark matter searches) and experimental data (direct dark matter searches, collider data) are used to narrow down the relevant parameters which would provide a consistent model. The underlying computations have been programmed in a stand-alone Fortran package which is however designed to interface with other packages.

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