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Asymmetries in Extended Dark Sectors: A Cogenesis Scenario

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The observed dark matter relic abundance may be explained by different mechanisms, such as thermal freeze-out/freeze-in, with one or more symmetric/asymmetric components. In this work we investigate the role played by asymmetries in determining the yield and nature of dark matter in non-minimal scenarios with more than one dark matter particle. In particular, we show that the energy density of a particle may come from an asymmetry, even if the particle is asymptotically symmetric by nature. To illustrate the different effects of asymmetries, we adopt a model with two dark matter components. We embed it in a multi-component cogenesis scenario that is also able to reproduce neutrino masses and the baryon asymmetry. In some cases, the model predicts an interesting monochromatic neutrino line that may be searched for at neutrino telescopes.

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