

On the evolution process of two-component dark matter in the Sun

We introduce the dark matter (DM) evolution process in the Sun under a two-component DM scenario. In this picture, both DM species could be captured by the Sun through DM-nucleus scattering and DM self-scatterings, e.g. $\chi\chi$ and $\xi\xi$ collisions. In addition, the heterogeneous self-scattering due to $\chi\xi$ collision is essentially possible in any 2DM models. This new introduced scattering naturally weaves the evolution processes of the two DM species that was assumed to evolve independently. Moreover, the heterogeneous self-scattering enhances the number of DM being captured in the Sun mutually. This effect significantly exists in a broad range of DM mass spectrum. If the annihilation final state contains neutrinos, the terrestrial neutrino detectors could distinguish whether DM is multicomponent or not.

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