

Gemini dark matter

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The S_8/σ_8 tension in the large scale structure can be explained by decaying dark matter with an almost degenerate spectrum and small enough decay width. Here we propose the Gemini dark matter model, which contains a heavy mother particle χ_3 and two twins $\chi_{1/2}$ which are almost degenerate in mass and are produced at the same time. The dark sector is charged under the same Froggatt-Nielsen symmetry that can explain the hierarchy of the Standard model Yukawa couplings. The slightly heavier χ_2 decays into χ_1 and the axionic component of the flavon, which washes out the small scale structure and resolves S_8/σ_8 tension. We present the production mechanism of Gemini dark matter and viable parameter regions. We find that despite the preferred dark matter mass being $\mathcal{O}(1)\text{--}\mathcal{O}(100)$ keV, they constitute cold dark matter. The Gemini dark matter model predicts an abundance of dark radiation that will be probed in future measurements of the CMB.

Primary authors: Dr CHEEK, Andrew (Tsung-Dao Lee Institute); Dr QIU, Yu-Cheng (Tsung-Dao Lee Institute); Mr TAN, Liang (Tsung-Dao Lee Institute)

Presenter: Dr QIU, Yu-Cheng (Tsung-Dao Lee Institute)

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