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Light feebly interacting massive particle: freeze-in production and galactic-scale structure formation

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Feebly interacting massive particles (FIMPs), contrasting with weakly interacting massive particles (WIMPs), is an intriguing dark matter candidate. Light (keV-scale) FIMPs produced by the freeze-in mechanism is of particular interest in that the structure formation of the Universe with FIMPs differs from that with WIMPs on galactic scales. The galactic-scale structure formation has been probed in many independent ways: Lyman-alpha forest spectra and the number of satellite galaxies in the Milky Way. We discuss the current constraints from observed galactic-scale structure and future prospects. Particular stress is placed on that the details of the production processes can impact the obtained constraints.

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