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Warm dark matter from a gravitational freeze-in in extra-dimensions

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We study the freeze-in of gravitationally interacting dark matter in extra-dimensions. Focusing on a minimal dark matter candidate that only interacts with the SM via gravity a five dimensional model we find that a large range of dark matter and Kaluza-Klein graviton masses can lead to the observed relic density. The preferred values of the masses and the strength of the interaction make this scenario very hard to text in terrestrial experiments. However, significant parts of the parameter space lead to warm dark matter and can be tested by cosmological and astrophysical observations.

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