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Probing late-time annihilations of oscillating asymmetric dark matter via rotation curves of galaxies

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This work investigates the Oscillating Asymmetric Dark Matter (OADM) model (1), with a fermionic dark matter particle in the sub-GeV mass range. The OADM model offers a new perspective on resolving the core-cusp problem, which highlights discrepancies between the ΛCDM cosmological model and observed dark matter distributions in dwarf spheroidal galaxies. OADM proposes a new mechanism for transforming cusp-like dark matter profiles into core-like ones through the reactivation of dark matter annihilation during the structure formation epoch. This occurs due to a small mass term that breaks DM particle number conservation, resulting in oscillations between dark matter and its antiparticle. To test this model, we analyzed galaxy rotation curves by fitting data from two surveys, SPARC (2) and LITTLE THINGS. (3) Our findings demonstrate that the OADM model effectively transforms cusp-like halos into core-like halos. We also identify preferred interaction cross-section values and compare them with predictions from self-interacting dark matter (SIDM) models, as well as constraints from merging galaxy clusters.

Palavras-chave: Dark matter; Rotation curves; Core-cusp problem.

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Referências:

1 CLINE, J. M. *et al.* Late-time dark matter oscillations and the core-cusp problem. **Journal of High Energy Physics**, v. 2021, n. 4, p. 1-48, 2021.

2 LELLI, F.; MCGAUGH, S. S.; SCHOMBERT, J. M. SPARC: mass models for 175 disk galaxies with Spitzer photometry and accurate rotation curves. **Astronomical Journal**, v. 152, n. 6, p. 157, 2016.

3 HUNTER, D. A. *et al.* Little things. **Astronomical Journal**, v. 144, n. 5, p. 134, 2012.