

# Constraints on Long-Range Dark Matter-Standard Model Interactions From Dynamical Friction in Ultrafaint Dwarf Galaxies

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I will present a new constraint on long-range interactions between dark matter and the Standard Model, based on the effects of dynamical friction in ultrafaint dwarf galaxies (UFDs). Parsec-scale interactions between dark matter and the Standard Model are currently poorly constrained. However, such long-range forces can lead to a gradual transfer of kinetic energy from stars to the dark matter halo, reducing the velocity dispersion of the galaxy's stars at late times. Measurements of velocity dispersions in dwarf galaxies, combined with conservative assumptions about their initial conditions, therefore lead to constraints on such interactions. In particular, observations of the Segue 1 UFD constrain new forces with ranges above  $O(1)$  mpc to be no stronger than  $O(100)$  times gravity, improving on existing bounds at these ranges by several orders of magnitude.

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