

Abstract Submitted
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Local dark matter density estimation using Doppler spectroscopy of stars and pulsar timing DAVID PHILLIPS, Harvard-Smithsonian Center for Astrophysics, AAKASH RAVI, NICHOLAS LANGELLIER, Department of Physics, Harvard University, MALTE BUSCHMANN, BENJAMIN SAFDI, Department of Physics, University of Michigan, RONALD WALSWORTH, Department of Physics & Department of Electrical and Computer Engineering, University of Maryland — Doppler spectroscopy of stars has been extremely successful in the detection of exoplanets. We show that this technique can also be used to directly measure the gravitational potential of the Milky Way galaxy, and thereby determine the local dark matter density without any assumptions of dynamic equilibrium. In our work, we present a realistic strategy to observe the differential accelerations of stars in our Galactic neighborhood with next-generation telescopes, and provide numerical simulations of the expected sensitivity of such a program. We also present preliminary results of similar acceleration measurements derived from pulsar timing data, with an analysis of systematic errors.

Aakash Ravi
Department of Physics, Harvard University

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