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Dark Matter Direct Search Rates in Self-Consistent Models of the Milky Way and Sagittarius Stream[1] CHRIS PURCELL, University of Pittsburgh — We analyze self-consistent N-body models of the Milky Way disk and the ongoing disruption of the Sagittarius dwarf, in order to determine how strongly these components of the Galactic environment affect scattering rates in experiments designed to detect dark matter via nuclear recoil events. We find that the accidental proximity of the solar neighborhood to the leading tidal arm of Sagittarius induces significant deviations from the standard halo model with respect to the phase and amplitude of the predicted annual modulation signal, and that the standard halo model is radically insufficient to describe event rates arising from the non-Maxwellian velocity distribution of the Milky Way host halo as it is globally contracted by the influence of the stellar disk. In the regime of light dark matter and for energy ranges similar to those probed by DAMA/LIBRA and CoGeNT, we conclude that these and other experiments may be significantly more sensitive to dark matter scattering than prior interpretations have found, and also that current constraints may already be distinguishing the presence of Sagittarian dark matter on Earth.

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