Erratum: Directly Detecting MeV-Scale Dark Matter via Solar Reflection
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In this Letter, we pointed out that additional direct detection sensitivity to dark matter (DM) in the 10 keV–10 MeV mass range is possible through consideration of "reflected DM" initially scattered by more energetic electrons in the Sun (or Earth) prior to scattering in the terrestrial underground detector.

As part of the calculation required to determine the reflected flux, the probability for a DM particle to scatter with a solar electron is determined according to its mean free path $l_{\rm fp}(r)$ at each radial location r within the Sun. In this Erratum, we correct the calculation to fully account for the dependence of $l_{\rm fp}(r)$ on the velocity v_r, the DM particle relative to the electron in each scattering event, i.e., $l_{\rm fp}(r) = [n_e(r)\langle\sigma_e v_r\rangle]^{-1} \times v_{\rm DM}$. This leads to a revised reflected DM energy spectrum in Fig. 3, and associated revisions to the constraint contours in Fig. 2. Updated results are presented in Fig. 1, and further details are contained in the Supplemental Material of the Letter. The conclusions of the Letter are otherwise unchanged.
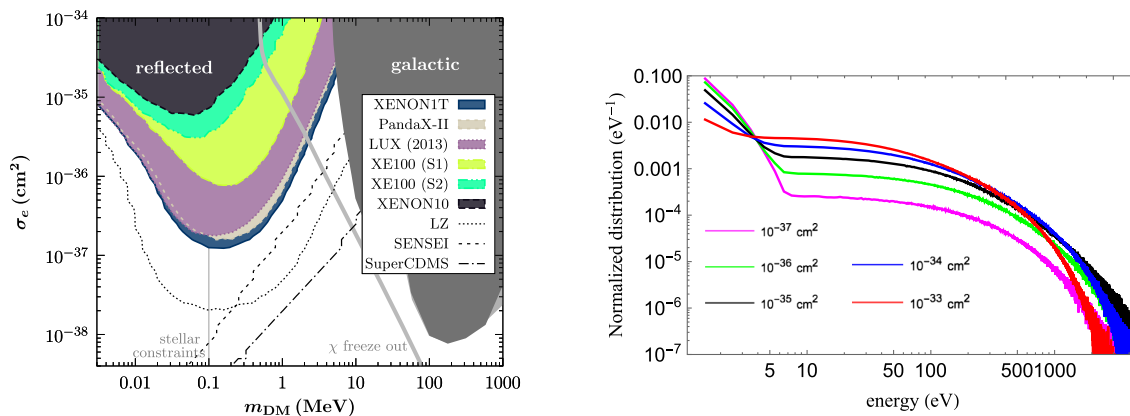

FIG. 1. (Left) Corrected version of Fig. 2 showing exclusion contours for reflected DM from a range of experiments, in comparison to previous limits from XENON10 and XENON100 on scattering from the "galactic DM" halo population. (Right) Corrected version of Fig. 3 showing the normalized energy distributions for reflected DM with a mass of 3 MeV and the range of scattering cross sections indicated. (See the captions of Figs. 2 and 3 in the Letter for further details).