

Erratum: Search for Light Dark Matter with 259 Days of Data in PandaX-4T [Phys. Rev. Lett. 135, 211001 (2025)]

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(Received 8 December 2025; published 10 February 2026)

DOI: [10.1103/dq19-jkqk](https://doi.org/10.1103/dq19-jkqk)

In the Letter, a search for light dark matter (LDM) particles using PandaX-4T data through its hypothetical interactions with nucleus or shell electrons was reported. This Erratum corrects the signal model and search results for the spin-dependent (SD) LDM-nucleus interactions, which were shown in Figs. 1 and 3 of the Letter, respectively.

The error was caused by a known feature of the TF1 class, an one-dimensional function class, in ROOT [1]. Energy spectra of the SD LDM-nucleus interactions are stored as instances of the TF1 class. TF1 objects created with certain

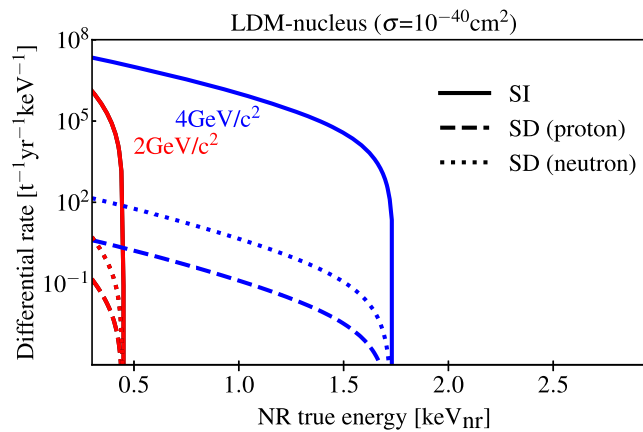


FIG. 1. The differential rates (in unit of events per metric ton per year per keV) of the DM scatterings off the target, assuming an LDM-nucleon cross section of 10^{-40} cm^2 . The red and blue lines represent LDM masses of $2 \text{ GeV}/c^2$ and $4 \text{ GeV}/c^2$. The spectra for the SI, proton-only SD, and neutron-only SD LDMs are shown in solid, dashed, and dotted lines, respectively.

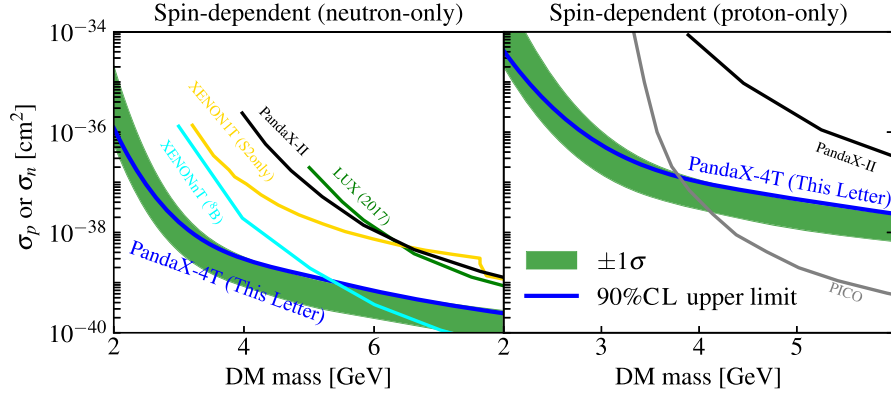


FIG. 2. The 90% CL exclusion limit(blue line) with 1σ sensitivity(green band) on neutron-only(left panel) and proton-only(right panel) spin-dependent DM-nucleon cross section, together with results from other work [2–6].

constructors store only discretized data points when serialized to ROOT files, rather than the full functional form. Due to the coarseness of the stored binning, reading these files for plotting or response calculation resulted in an inaccurate representation of the spectra. The correct energy spectra of the SD LDM-nucleus interactions are provided in Fig. 1.

This error has a nonnegligible impact on the limits for the SD LDM-nucleus interaction cross section. The lower mass of the limit has been raised to 2 GeV/ c^2 . Figure 2 shows updated limit curves.

The corrected Letter can also be found in [7].

We would like to thank Professor Hyun Su Lee and Shenyang Shi for pointing out this issue and valuable discussions.

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