Erratum: Scintillation time dependence and pulse shape discrimination in liquid argon [Phys. Rev. C 78, 035801 (2008)]

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We have found an error in the code used to perform the multibin method analysis of Sec. III C, in which events were compared to a template trace calculated from the wrong photoelectron bin [the index l in Eqs. (14) and (15) did not match the observed signal size of the event]. Figures 9, 12, and 13 are affected by this error as well as the conclusions drawn from that section. The multibin method still outperforms the prompt fraction method, but only by a factor of 1.5 to 3 instead of the order of magnitude stated previously. In our corrected analysis, we have rebinned the data so that the width of the highest energy bin is now narrower. To mitigate the bias associated with an unblind choice of binning, we construct the highest energy bin so that it includes the highest energy single keVee bins containing leakage or background events. With this binning, the electronic recoil contamination (ERC) from the multibin method is now 1.7×10^{-6} between 55 keVr and 110 keVr (two contamination events), and there is no leakage above 62 keVr. For the same energy interval, the ERC from the prompt fraction method is 4.9×10^{-6}. We have replotted the results accordingly in the corrected Fig. 9.

In addition, we would like to make two typographical corrections. In the last paragraph of the left column of page three, the third sentence should read as follows: "We use the second γ ray to tag electronic recoil events in the liquid. . ." On the same page, the ninth line of the right column should read as follows: "In the liquid argon, most of the 511-keV γ rays Compton scatter. . ."[1]

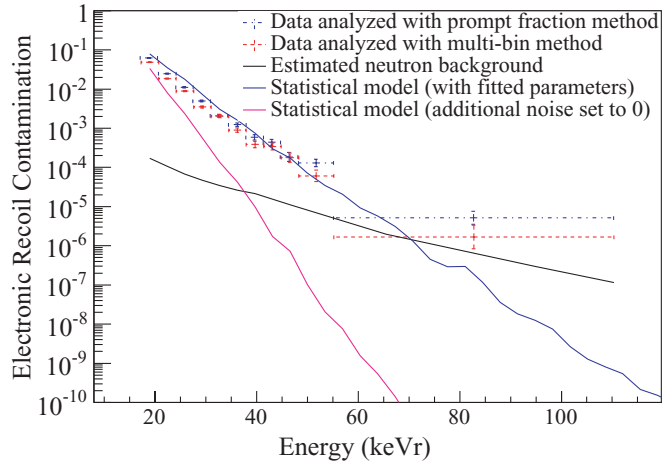

FIG. 9. (Color online) Measured electronic recoil contamination obtained by using the prompt fraction method and the multibin method. Also shown are the background estimation and model predictions described in the text. We include a model with the additional noise set to 0 for comparison. There were no contamination events above 69 keVr observed by use of either method. The energy axis has been scaled from keVee to keVr by use of a constant nuclear recoil scintillation efficiency of 0.29, as discussed in the text.

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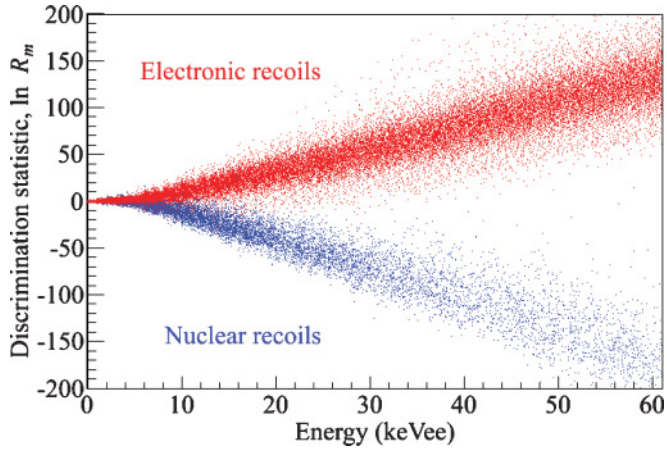

FIG. 12. (Color online) A scatter plot of ln R_m vs. energy for both electronic and nuclear recoils.

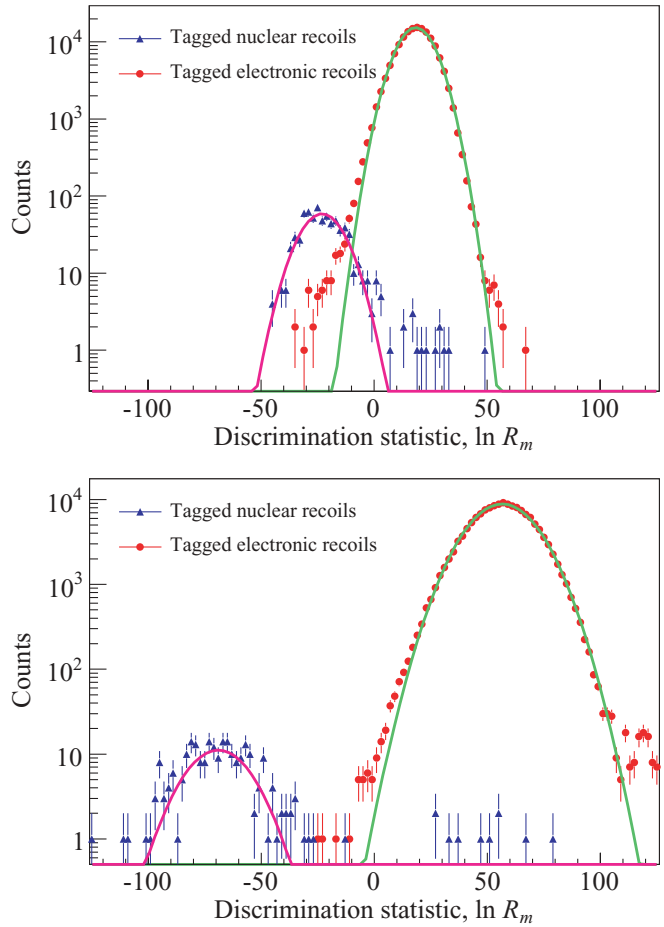

FIG. 13. (Color online) Projections of Fig. 12 onto the y axis for (top) 14–15 keVee and (bottom) 30–31 keVee events, with Gaussian fits to both the (right) electronic and (left) nuclear recoil distributions.