

**Erratum: Measurements and models of enhanced recombination
following inner-shell vacancies in liquid xenon
[Phys. Rev. D **112**, 012024 (2025)]**

J. Aalbers *et al.*

(LZ Collaboration)*



(Received 4 September 2026; published 6 October 2026)

DOI: [10.1103/PhysRevD.114.079902](https://doi.org/10.1103/PhysRevD.114.079902)

We correct an error in the xenon K-shell multiple-scatter (MS) charge yield measurements reported in Table IV of the original article. This affects Secs. III, V, and Figs. 6, and 7.

For K-shell MS events, we now implement an additional cut to suppress contamination from neutron-activated $^{129\text{m}}\text{Xe}$. This decay involves two nuclear transitions at 40 and 197 keV, producing a total deposited energy that overlaps with the ^{127}Xe K-shell peak ($203 + 33.2$ keV). While the relaxations typically emit localized conversion electrons, in 5% of decays the 197 keV transition produces a γ ray that can become spatially separated from the primary vertex, generating an MS topology. In the WS2022 dataset, cosmogenic ^{127}Xe dominates over $^{129\text{m}}\text{Xe}$, and temporal cuts were originally applied to remove periods of elevated $^{129\text{m}}\text{Xe}$ activity associated with neutron calibrations. Therefore, the WS2022 measurements are not significantly affected by $^{129\text{m}}\text{Xe}$. In WS2024, however, the decreased activity of ^{127}Xe and the higher frequency of neutron calibrations allowed $^{129\text{m}}\text{Xe}$ to leak into the MS selection. Now, the K-shell MS selection is restricted to ^{125}Xe decays by requiring a minimum total deposited energy of 260 keV.

The corrected MS K-capture measurement for WS2024 is now consistent with the SS-selection measurement and with the $\gamma + \beta$ multisite expectation. The original article reported a tension between the MS and SS methods in this channel. Now, the MS and SS methods are in good agreement for M, L, and K shells.

The corresponding entries of Table IV, Figs. 6 and 7 (the bottom-right panel of Fig. 6 and the right-hand panel of Fig. 7) in the original article are updated and shown below as Table IV, Figs. 6, and 7.

This correction does not affect the paper's central conclusions. The Thomas-Imel box model interpretation and the impact of double-electron capture on WIMP sensitivity are unchanged.

TABLE IV. Corrected K (MS) entries of Table IV. All other entries in Table IV are unaffected.

Run	$Q_y^{\text{EC}} [e^-/\text{keV}]$	$Q_y^{\text{EC}}/Q_y^\beta$
LZ WS2022 (193 V/cm)	$21.43 \pm 0.05_{\text{stat}} \pm 0.31_{\text{sys}}$	$0.920 \pm 0.002_{\text{stat}} \pm 0.004_{\text{sys}}$
LZ WS2024 (96.5 V/cm)	$18.35 \pm 0.07_{\text{stat}} \pm 0.61_{\text{sys}}$	$0.969 \pm 0.004_{\text{stat}} \pm 0.022_{\text{sys}}$

*Full author list given in the original article.

Published by the American Physical Society under the terms of the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/) license. Further distribution of this work must maintain attribution to the author(s) and the published articles title, journal citation, and DOI.

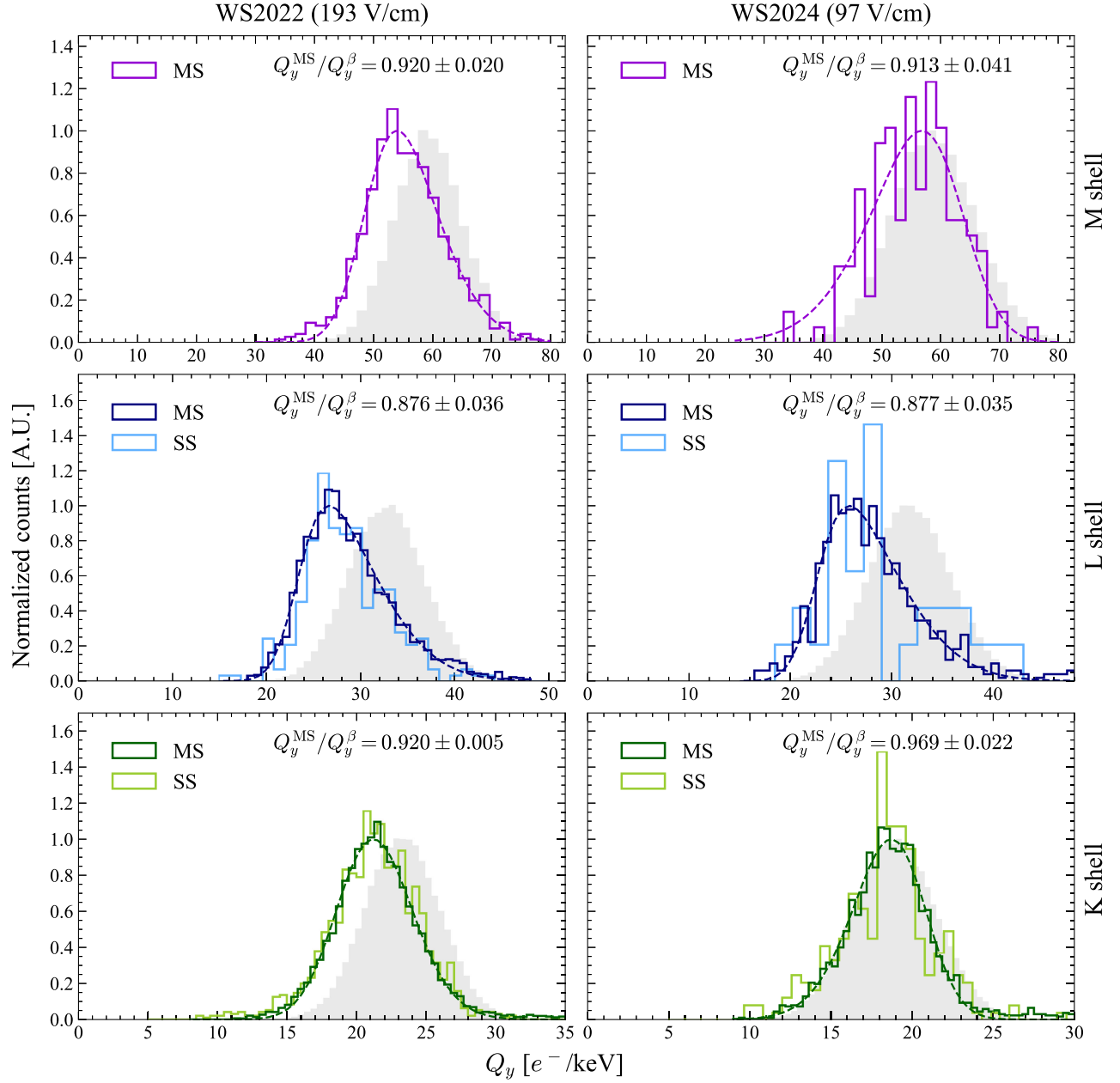


FIG. 6. The full set of measured EC charge yield distributions in LZ data at two different field configurations, for each of K-, L-, and M-shell captures. The bottom right panel has been updated. With the exception of the M-shell case, Skin-tagged (SS) samples are overlaid onto MS selections to highlight their compatibility. Skew-Gaussian fits to the MS distributions are also shown as dashed lines. To demarcate where ECs lie with respect to standard ER interactions, the yields from equivalent monoenergetic electrons drawn from the NEST β model are included in gray.

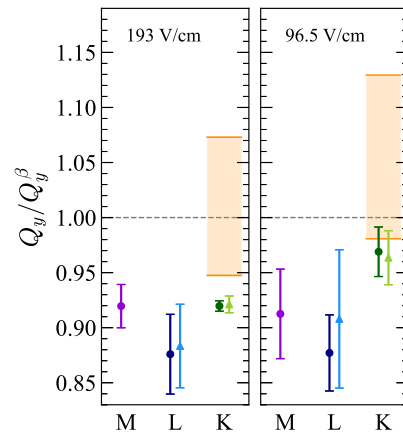


FIG. 7. Summary of charge yield ratios measured with the MS selection (dark circles) and the SS selection (light triangles). The right panel has been updated. The M- and L-capture Q_y ratios should be compared directly with the β model (dashed line), while the K-capture measurements should be compared to the multisite expectation (orange bands), where the lower (upper) line corresponds to x-ray modeled in NEST as a γ (β) interaction.