Erratum: Comparison of simulated neutrino emission models with data on Supernova 1987A [Phys. Rev. D 104, 123020 (2021)]

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In this paper, two errors were discovered in our analysis code. The first error reduced N_p by ∼10% due to an incorrect conversion factor, while the second effectively reduced the variance of $p(d|M_i)$. The net result of correcting both errors is that model A is now strongly to very strongly preferred over model B, regardless of the oscillation scenario, with a Bayes factor of $B_{ij} \approx 92$–196. Model A is positively favored over model C with a Bayes factor of $B_{ij} \approx 4.2$–11. The values of $p(M_i|D)$ for models A′, B′, and C′ remain unchanged, although the best-fit values of K have been reduced somewhat. The best-fit values of $\langle N \rangle$ have changed slightly for both sets of models, as did the p value for model B′ (NH).

The results for models A, B, and C presented in the original Table III are corrected here in Table I; similarly, the results for models A′, B′, and C′ in the original Table IV are corrected here in Table II.

In addition, the revised credible regions for the unprimed and primed models are displayed in Figs. 1 and 2 (Figs. 2 and 3 in the original publication). Notice in particular that wider ranges of d are now included in the credible regions for models A, B, and C; the 95% credible regions now enclose variations of $\sim \pm 3$–4 kpc ($\sim \pm 2\sigma$–3σ). The best-fit values of d are still consistent with the measured value of 51.4 ± 1.2 kpc regardless of neutrino oscillations.

While Figs. 4–6 in the original publication are affected by the corrections in this erratum only slightly, we include them for completeness here as Figs. 3–5.

TABLE I. The corrected table of the best-fit values of d and $t_{\rm off}$, the corresponding $\langle N \rangle$, and the posterior probabilities for models A, B, and C for the three neutrino oscillation scenarios. In the original publication, the uncorrected version appeared as Table III.

Model	d (kpc)	$t_{\rm off}$ (s)	$\langle N \rangle$	$p(M_i\|D)$
A (NO)	51.33	0.048	7.49	0.3325
A (NH)	51.34	0.036	7.89	0.3089
A (IH)	51.38	0.024	8.70	0.2198
B (NO)	52.02	0.054	21.03	0.0023
B (NH)	52.02	0.054	20.94	0.0024
B (IH)	52.00	0.026	20.76	0.0017
C (NO)	51.78	0.051	16.41	0.0520
C (NH)	51.77	0.051	16.38	0.0502
C (IH)	51.77	0.033	16.30	0.0302

TABLE II. The corrected table of the best-fit values of K and $t_{\rm off}$, the corresponding $\langle N \rangle$, and the posterior probabilities for models A′, B′, and C′ for the three neutrino oscillation scenarios. In the original publication, the uncorrected version appeared as Table IV.

Model	K	$t_{\rm off}$ (s)	$\langle N \rangle$	p value	$p(M_i\|D)$
A′ (NO)	1.20	0.048	8.91	0.16	0.2638
A′ (NH)	1.15	0.036	9.01	0.19	0.2223
A′ (IH)	1.05	0.024	9.12	0.25	0.1359
B′ (NO)	0.42	0.054	9.20	0.19	0.0400
B′ (NH)	0.42	0.054	9.16	0.26	0.0385
B′ (IH)	0.43	0.026	9.28	0.39	0.0245
C′ (NO)	0.54	0.051	9.11	0.12	0.1108
C′ (NH)	0.55	0.051	9.25	0.17	0.1038
C′ (IH)	0.55	0.033	9.21	0.25	0.0603

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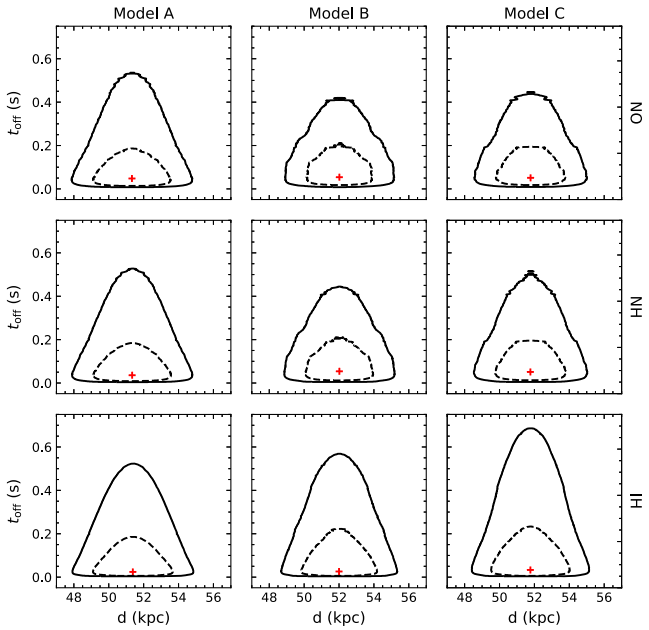

FIG. 1. The corrected version of Fig. 2. The dashed and solid curves indicate the 68% and 95% credible regions, respectively, for d and $t_{\rm off}$, while the best-fit values are denoted by the plus. We display these results for models A, B, and C for each oscillation scenario.

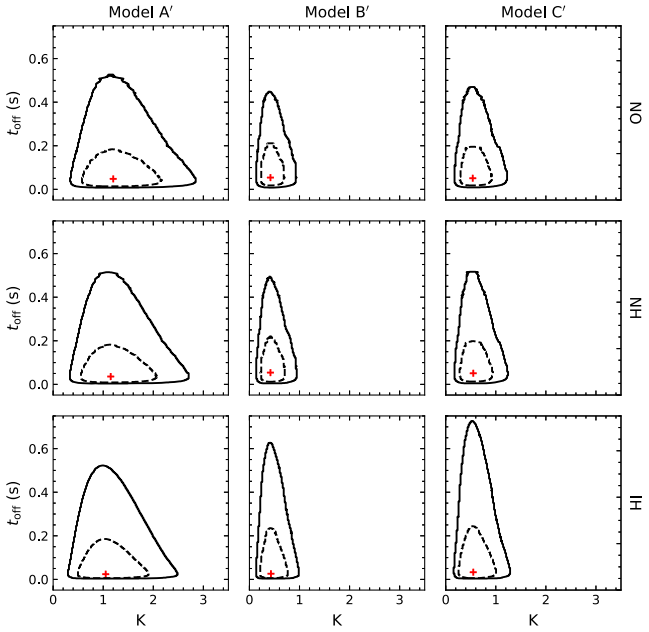

FIG. 2. The corrected version of Fig. 3. The dashed and solid curves indicate the 68% and 95% credible regions, respectively, for K and $t_{\rm off}$, while the best-fit values are denoted by the plus. We display these results for models A′, B′, and C′ for each oscillation scenario.

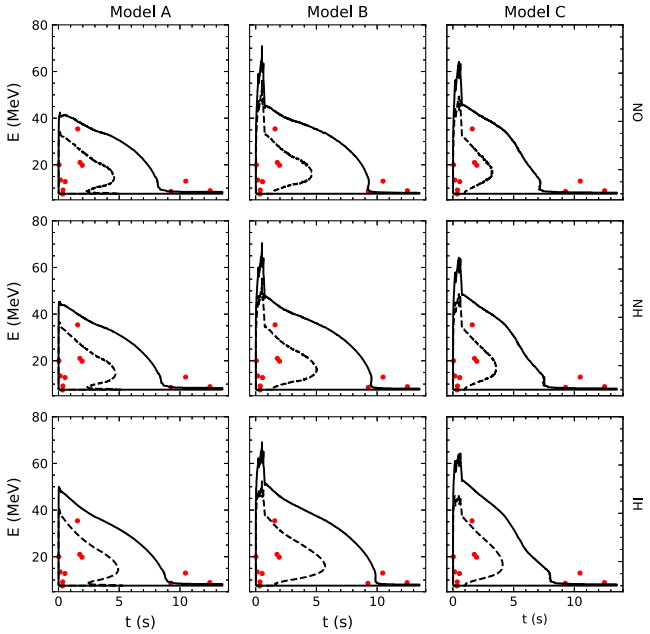

FIG. 3. The corrected version of Fig. 4. The dashed and solid curves contain 68% and 95% of the expected neutrino events, respectively, for the best-fit models A, B, and C assuming each neutrino oscillation scenario, while the filled circles indicate the data on SN 1987A.

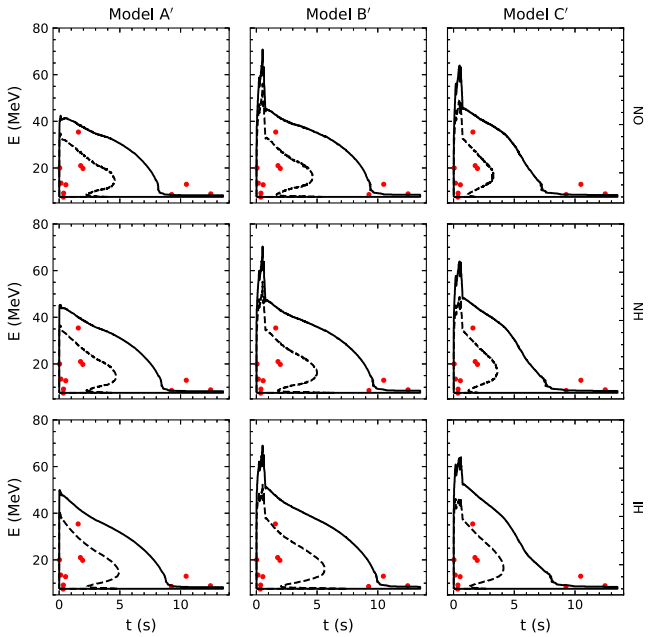

FIG. 4. The corrected version of Fig. 5. The dashed and solid curves contain 68% and 95% of the expected neutrino events, respectively, for the best-fit models A′, B′, and C′ assuming each neutrino oscillation scenario, while the filled circles indicate the data on SN 1987A.

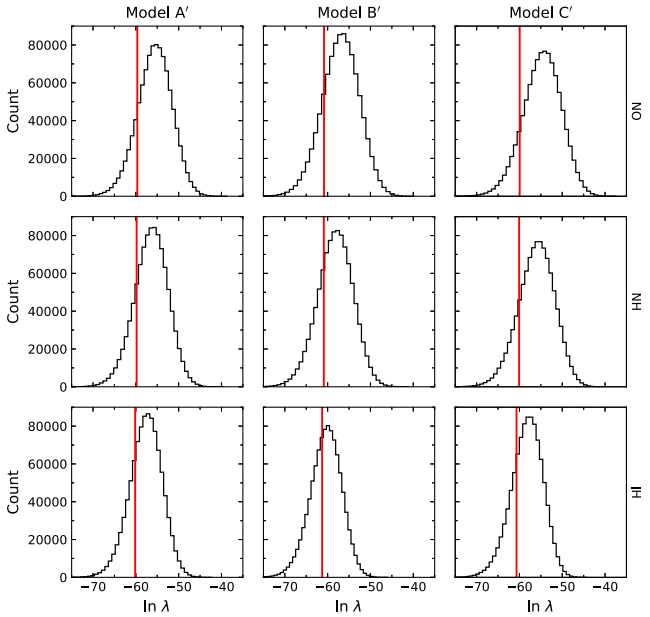

FIG. 5. The corrected version of Fig. 6. Each histogram displays the values of the statistic $\ln \lambda$ for 10^6 samples drawn from each of the best-fit models A′, B′, and C′ for the three neutrino oscillation scenarios, while the values of $\ln \lambda_{\rm det}$ under each model and oscillation scenario are indicated by the red lines.

Finally, because of the changes to the best-fit values of K, the total energy emitted in all neutrino species for model A′ is now $\mathcal{E}_\nu \approx (2.1\text{–}2.4) \times 10^{53}$ ergs depending on the neutrino oscillation scenario, while the best-fit models B′ and C′ both have $\mathcal{E}_\nu \approx 1.8 \times 10^{53}$ ergs in all three oscillation scenarios.

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