

Erratum: Detecting Gravitational Wave Memory in the Next Galactic Core-Collapse Supernova [Phys. Rev. Lett. 133, 231401 (2024)]

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The neutrino-induced gravitational waveforms, a component of the total (matter plus neutrino) waveforms used to demonstrate the efficacy of the proposed detection method for gravitational wave memory, were computed incorrectly. They were underestimated by a factor of 4π . As a result, the detection results improve and, most important, our primary conclusions are only reinforced. In particular, with the corrected waveforms, see Figs. 1 and 3, the signal for D9.6-3D is, in fact, detectable at 1 kpc, see Fig. 4. The corrected fit parameters are presented in Table I. The false alarm probability for all three signals (D9.6-3D, D15-3D, and D25-3D) is impacted, as shown in Fig. 5. Figure 5 demonstrates that our proposed method can reliably detect the D9.6-3D signal at 1 kpc for all cutoff values, but our conclusions regarding the inability to detect this signal at 10 and 100 kpc remain the same. We see a boost in the detectability of the D15-3D and D25-3D signals. We now obtain a lower false alarm probability at 10 and 100 kpc.

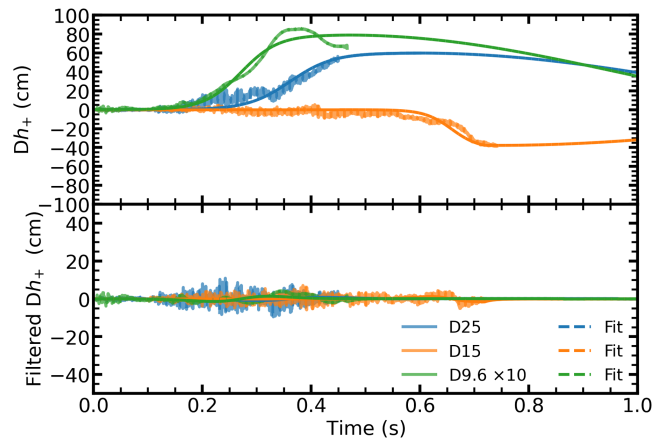


FIG. 1. Gravitational wave signals from all three models. Solid lines show the signals from the simulations. Dashed lines show the fit of the waveforms to a logistic function with a tapering [see Eq. (1) and Table I]. The top panel displays unfiltered signals; the bottom panel shows the same signals with an 8 Hz high-pass Butterworth filter applied. The D9.6 signal is scaled up by a factor of 10.

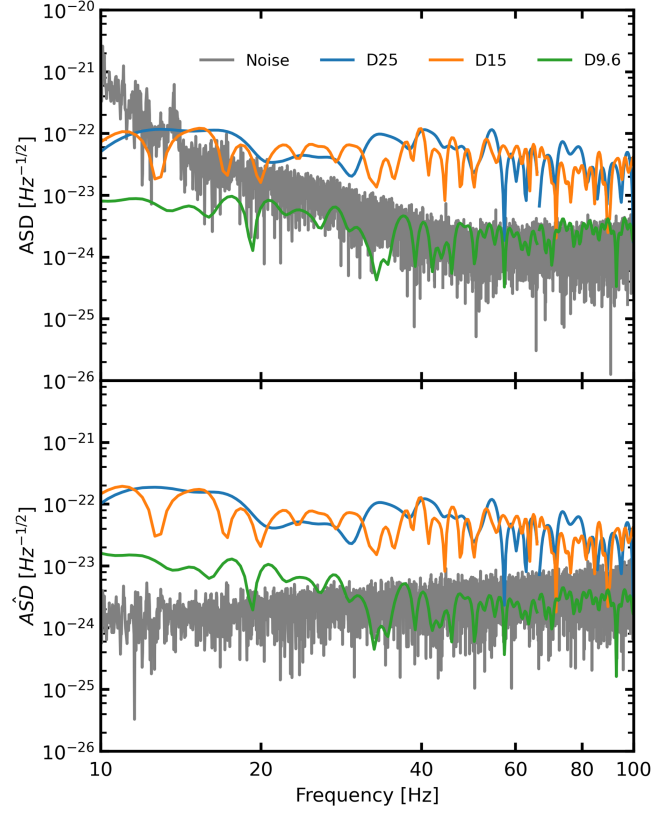


FIG. 3. Top: the amplitude spectral density of (1) the noise data from the Livingston detector (gray) and (2) the three signals (colored lines). Inset: the convergence of the LPF as a function of training time. Bottom: the amplitude spectral density of (1) the detector noise with the part predicted by the LPF subtracted (gray) and (2) the whitened signals (colored lines). Signals were scaled to a source distance of 1 kpc.

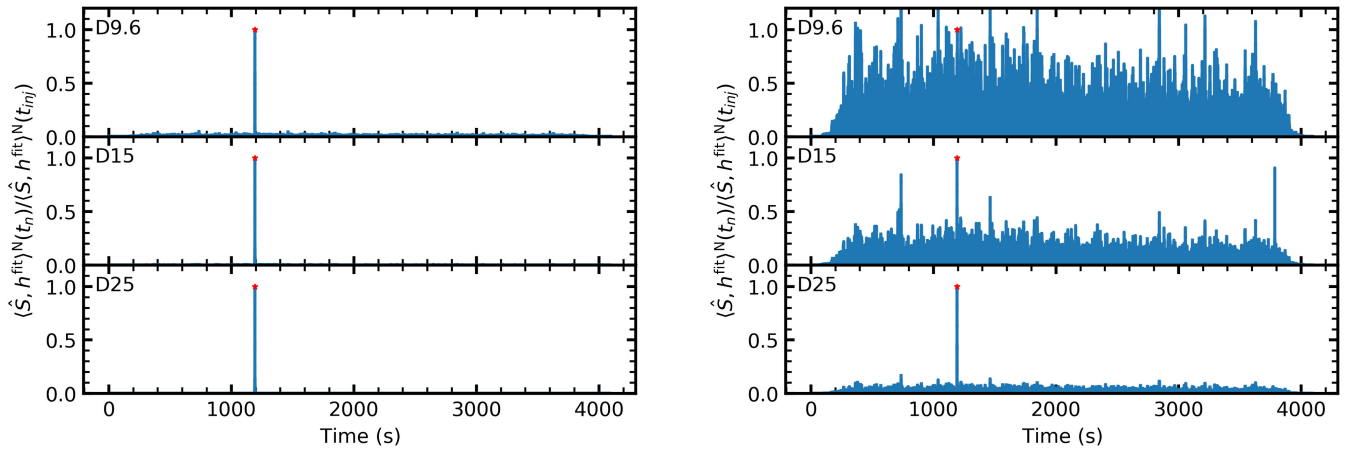


FIG. 4. The two-detector correlation [Eq. (4)] between the filtered templates (bottom panel of Fig. 1) and the whitened detector data. The top, middle, and bottom panels correspond to signals from the D9.6, D15, and D25 models, respectively, all at a distance of 1 kpc (left) and 10 kpc (right). The star indicates the location of injection.

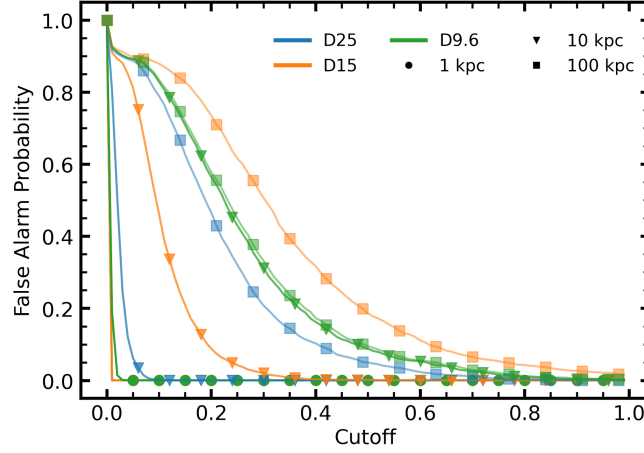


FIG. 5. The false alarm probability as a function of the correlation threshold used to accept a trigger. Different line markers indicate different source distances, and the colors correspond to different models.

TABLE I. The parameters used for the fit and tapering of the GW signals from the simulations [see Eq. (1)]. Each row corresponds to a particular model.

Model	t_0 (s)	L (cm)	k (hz)	t_s (s)	f_t (Hz)
D9.6	0.27	7.92	29.33	0.300	0.1
D15	0.68	−40.96	40.01	0.7414	0.1
D25	0.36	60.0	25.6	0.472	0.1

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- [1] A. Lella, G. Lucente, D. Kresse, R. Glas, H.-T. Janka, and A. Mirizzi, Gravitational-wave signals for supernova explosions of three-dimensional progenitors, *Phys. Rev. D* **113**, 083034 (2026).