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Gravitational Waves from Fallback Accretion in Long Gamma-Ray Bursts KIRANJYOT GILL, Embry-Riddle Aeronautical University, SARAH GOSSAN, Caltech, LIGO COLLABORATION — The collapsar scenario for long gamma-ray bursts (GRBs), detailed by fallback accretion onto a nascent neutron star and subsequent collapse to a black hole, presents a promising source of gravitational waves (GWs) in the sensitive band for ground-based GW detectors. Piro & Thrane (2012) introduced an analytical model for GW emission from fallback accretion in long GRBs, detailing the spin-up of the neutron star and saturation of secular non-axisymmetric instabilities, which sources GW emission until the neutron star collapses to a black hole. We augment this model to consider finite-temperature equations of state, and consequently, realistic mass-radius evolution and maximum neutron star mass. In addition to this, we investigate the plausibility of hybridising this model with a black hole ringdown term to describe the late-time evolution of the system. We outline the analysis to search for such GW signals, and explore their detectability with second-and-third-generation ground-based GW detectors.

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