Abstract Submitted
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Multi-waveform cross-correlation search method for intermediate-duration gravitational waves from gamma-ray bursts[1] ERIC SOWELL, LIGO, APS, TTU, LIGO COLLABORATION — Gamma-ray Bursts (GRBs) are flashes of γ-rays thought to originate from rare forms of massive star collapse (long GRBs), or from mergers of compact binaries (short GRBs) containing at least one neutron star (NS). The nature of the post-explosion / post-merger remnant (NS versus black hole, BH) remains highly debated. In $\sim 50\%$ of both long and short GRBs, the temporal evolution of the X-ray afterglow that follows the flash of γ-rays is observed to "plateau" on timescales of $\sim 10^2 - 10^4$s since explosion, possibly signaling the presence of energy injection from a long-lived, highly magnetized NS (magnetar). The Cross-Correlation Algorithm (CoCoA) proposed by [R. Coyne et. al., Phys Rev D. 93 104059 (2016)] aims to optimize searches for intermediate-duration ($10^2 - 10^4$s) gravitational waves (GWs) from GRB remnants. In this work, we test CoCoA on real data collected with ground-based GW detectors. We further develop the detection statistics on which CoCoA is based to allow for multi-waveform searches spanning a physically-motivated parameter space, so as to account for uncertainties in the physical properties of GRB remnants.

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