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Search for Gravitational Waves Associated with Gamma-Ray Bursts During the Second Advanced LIGO Observing Run ROBERT COYNE, University of Rhode Island, LIGO SCIENTIFIC COLLABORATION — The joint-observation of an astrophysical event with both gravitational wave (GW) and electromagnetic (EM) observatories has long been a dream of the astronomical community. With the recent detection of binary neutron star (BNS) merger GW170817 by LIGO/Virgo and its associated gamma-ray burst (GRB) by EM observatories that dream is now reality, entering us into a new age of multi-messenger astronomy. But this event marks only the beginning. While GW170817 represents the "smoking gun" for BNS mergers being the progenitor of at least some (short) GRBs, there remain many questions about the nature of these energetic cosmic events. Here we report on efforts to perform targeted GW analysis of GRBs reported by EM observatories during LIGO's second observing run (O2). In addition to detailed followup of GW170817, we discuss the analysis of sub-threshold GRBs that follow naturally from the GW170817 search. We also analyze nearly 250 other GRBs, searching both for unmodeled GW bursts as well as BNS signals coincident with their EM counterparts. This "archival" search benefits from improved sensitivity over rapid "online" searches performed throughout O2 thanks to finalized data calibration. Beyond preliminary results, we also look forward to improvements for LIGO's third observing run.

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