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Gamma Ray Burst Observations with LIGO

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A new era in gravitational wave astronomy is about to begin, as the LIGO and Virgo laser interferometers are preparing for the operation of enhanced detectors at unprecedented sensitivity. Right at the beginning of the observational era, most interesting science will come from multi-messenger observations, where the gravitational wave signal has an electromagnetic counterpart; in particular, Gamma Ray Bursts have been the focus of LIGO searches since the early days of its data acquisition. Short Gamma Ray Bursts (GRBs) are believed to be produced in the merger of a neutron star binary or a neutron star-black hole binary, thus producing a gravitational wave signature that can be targeted with templated searches for compact binary coalescences. At the same time, sensitive, unmodeled burst searches are also implemented to cover other possible models for both short and long GRBs. Information on the progenitor (time, source location) is used to increase the sensitivity of the search and, in the event of a detection, confidence in the result. For close events, as in the case of GRB070201, even the absence of a detection yields useful insights in the physics of GRBs. In this talk I will review LIGO's effort for the observation of Gamma Ray Bursts, with methods, interpretations and prospects, in the upcoming era of Enhanced and Advanced LIGO.