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Searching for Gravitational-Wave / Gamma-Ray-Burst associations in LIGO/Virgo and Fermi-GBM data

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The GW170817 event provided the first observation of gravitational waves from a neutron star merger with associated transient counterparts across the entire electromagnetic spectrum. This discovery demonstrated the long-hypothesized association between short gamma-ray bursts and neutron star mergers. More joint detections are needed to explore the relation between the parameters inferred from the gravitational wave and the properties of the gamma-ray signal, potentially ruling out some of the existing models of the physical processes responsible for these
events.
Groups in LIGO/Virgo/KAGRA, Fermi and Swift collaborations have developed many searches for joint gravitational-waves/gamma-ray- bursts detections. We will, first of all, give a general overview of all theses searches that assumed that at least one of gravitational-wave or gamma-ray-burst candidate is a confident event. We will finally present a new and deeper method aimed at detecting weak GW transients associated with weak gamma-ray- bursts. Contrary to other searches, this search for coincidences between the gravitational—waves and gamma-ray-bursts triggers does
not require a confident detection in one of the two channels.

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