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Multi-messenger search for gravitational waves and high energy neutrinos.

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With the recent development of experimental techniques that have opened new windows of observation of the cosmic radiation in all its components, multi-messenger astronomy is entering an exciting era. Many astrophysical sources and cataclysmic cosmic events with burst activity can be plausible sources of concomitant gravitational waves (GWs) and high-energy neutrinos (HENs). Such messengers could reveal hidden and new sources that are not observed by conventional photon astronomy, in particular at high energy. Requiring consistency between GW and HEN detection channels enables new searches and a detection would yield significant additional information about the common source. We present the results of the first search for gravitational wave bursts associated with high energy neutrino triggers, detected by the underwater neutrino telescope ANTARES in its 5 lines configuration, during the fifth LIGO science run and first Virgo science run. No evidence for coincident events was found. We place a lower limit on the distance to GW sources associated with every HEN trigger. We are able to rule out the existence of coalescing binary neutron star systems and black hole-neutron star systems up to distances that are typically 5 Mpc and 10 Mpc, respectively.

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