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Analysis Method to Search for Coincidence Events between the LIGO-Virgo Gravitational-wave Detector Network and the IceCube Neutrino Detector YOICHI ASO, Columbia University, CHAD FINLEY, University of Wisconsin Madison, ZSUZSA MARKA, JOHN DWYER, Columbia University, KEI KOTAKE, National Astronomical Observatory of Japan, SZABOLCS MARKA, Columbia University — Violent astrophysical phenomena such as gamma-ray bursts may produce gravitational wave emission along with high energy neutrinos. A network of gravitational wave detectors such as LIGO and Virgo can determine the direction of gravitational wave bursts while the IceCube neutrino detector can also provide accurate directional information for neutrino events above 100GeV. By combining timing and directional information of events from these two independent detectors, we can search for coincident events that may arrive from common astrophysical sources. The coincidence analysis reduces the false alarm rate, and this in turn allows the trigger threshold to be relaxed and improves the ability to detect a shared class of sources. While the method can be applied to various combinations of detectors, we will present our method specifically for the case of the LIGO-Virgo network and IceCube, using the results of Monte Carlo simulations to demonstrate its performance.

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