

Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Early warning gravitational-wave alerts RYAN MAGEE, LIGO Laboratory, Caltech, LEO SINGER, NASA Goddard, DEEP CHATTERJEE, UIUC, SURABHI SACHDEV, Penn State, GEOFFREY MO, MIT, MANOJ KOVALAM, UWA — Gravitational-wave observations became commonplace in Advanced LIGO/Virgo’s recently concluded third observing run. 56 non-retracted candidates were identified and publicly announced in near real time. Gravitational waves from binary neutron star mergers, however, remain of special interest since they can be precursors to high-energy astrophysical phenomena like γ -ray bursts and kilonovae. While late-time electromagnetic emissions provide important information about the astrophysical processes within, the prompt emission along with gravitational waves uniquely reveals the extreme matter and gravity in the aftermath of the merger. Rapid communication of source location and properties from the gravitational-wave data is crucial to facilitate multi-messenger follow-up of such sources. This is especially enabled if the partner facilities are forewarned via an early-warning (pre-merger) alert. Here we describe the commissioning and performance of such a low-latency infrastructure within LIGO/Virgo. We present results from an end-to-end mock data challenge that detects binary neutron star mergers and alerts partner facilities before merger. We set expectations for these alerts in future observing runs.

Ryan Magee
LIGO Laboratory, Caltech

Date submitted: 11 Jan 2021

Electronic form version 1.4