

Early warning detection of gravitational waves from binary neutron star coalescences

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GW170817 was the first gravitational-wave event that was also observed in the electromagnetic spectrum. However, its optical counterpart was not detected for ten hours after the merger since the sky-localization was below the horizon for most of the observing telescopes. Therefore, we are left with open questions regarding the electromagnetic emission in all wavelengths except gamma rays for the first ten hours. Our goal is to provide alerts for neutron star – neutron star coalescences ten seconds to a minute before merger, with a rough sky location to allow the electromagnetic facilities to be ready and observing in advance of the merger, and to capture the earliest possible light with narrow field instruments. We present the results from a mock data study and show the expected rates and sky localizations of such events as a function of time before coalescence. We also discuss a case study of GW170817 with the early warning detection pipeline.