

## Abstract

### GRANDMA Observations of ZTF/Fink Transients during Summer 2021

After the discovery of new astronomical messengers, events with both gravitational waves (GWs) and electromagnetic (EM) emissions are no longer a dream of the astronomical community. A breakthrough for GW multi-messenger astronomy came when the LIGO-Virgo network detected a GW signal of two low-mass compact objects consistent with a binary neutron star (BNS, GW170817), an event that generated a short gamma-ray burst (GRB), and a kilonova. While GW170817 represents the testimony to BNS mergers being the progenitor of at least some GRBs, a wide range of highly energetic astrophysical phenomena is expected to be accompanied by the emission of GWs and photons. Despite efforts, during the last observational run of LIGO and Virgo, no optical counterparts were in coincidence with BNS events, leaving GW170817 the GW multimessenger event ever reported. In order to optimize our chances to detect such an event, a survey of telescopes was created to efficiently observe these faint and fast-evolving transients in a collaboration called GRANDMA. This international consortium of telescopes is designed to detect and follow up EM counterparts to GWs events or any other transients such as supernova or GRB afterglow for example. Hence, to prepare for it the next LIGO Virgo observational run, O4, the collaboration organized a large campaign of observations so-called "Ready for O4 during". The instruments, including professional and amateurs telescopes, observed 12 optical transients detected by the ZTF survey. GRANDMA collaboration was able to observe events less than 12h after the ZTF alerts. Nonetheless, with the data collected GRANDMA was able to better characterize the kilonova nature of the transients rather than just the quick ZTF observations alone. Here, I present the details of such an observational campaign, the analysis performed, the results, and the capabilities we will have for the O4 run.

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