Optimizing the search for electromagnetic counterparts (EM) to Gravitational Wave (GW) events with the Liverpool Telescope (LT) PRIYADARSHINI RAJKUMAR, Texas Tech University, CHRIS COPPER-WHEAT, DANIEL PERLEY, Liverpool John Moores University — Our understanding of gravitational wave (GW) events is enhanced by identifying and studying their electromagnetic (EM) counterparts. For nearby GW events with a small localization uncertainty, an effective strategy is to search for new transient sources in previously catalogued galaxies, whose properties are consistent with the GW data. Even with a limited field of view, such as that of the Liverpool Telescope (LT), it is plausible to discover the EM counterparts using an efficient observational strategy. But because many galaxies must be observed and the EM counterparts are faint and fade rapidly, a reliable automatic procedure is crucial to schedule observations. To meet these challenges, we designed an algorithm in Python that uses a catalogue of nearby galaxies and the 3D GW localization map to create a prioritized list of galaxies based on GW error-map probability, observability, and absolute magnitude. We tested our algorithm with past GW events and, within a few minutes, obtained consistent results with previous observations. Thus, this algorithm can swiftly assist in the formulation of effective follow-up plans which should increase the probability of localizing EM counterparts.

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