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Light-curve models of radiation counterparts from the merger of compact objects in AGNs

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Time-domain surveys, such as DECam, ZTF, and the forthcoming Vera Rubin Telescope, open new possibilities for discovering explosive transients in our Universe. Optical flares, in particular, have been widely considered as potential counterparts to gravitational waves measured by the LIGO-Virgo-KAGRA Collaboration (LVK). While binary black hole (BBH) mergers dominate the population of gravitational wave (GW) events measured by the LVK, the origin of their potential multi-messenger signals is currently not well understood. In this presentation, we introduce new theoretical models predicting radiation signatures associated with BBH mergers in active galactic nuclei (AGNs), which are promising locations for a significant fraction of the GWs measured by the LVK experiment. The radiation feedback predicted from our analysis is comparable to or exceeds the emission of the hosting AGN. Specifically, we derive light curve models at optical wavelengths as a function of the parameters of the hosting AGNs and the merger event. Such theoretical models are applicable for localising radiation signals measured by time-domain surveys that can be associated with GW events.

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