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Electromagnetic Flares Associated with Compact Object Mergers in Disks of Active Galactic Nuclei

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In the disks of active galactic nuclei (AGN), compact objects and stars are thought to be embedded and densely populated. These compact objects are predicted to merge with each other, representing one of the promising channels for stellar-mass black hole (BH) mergers discovered through gravitational waves (GWs). Due to the uncertainties of these processes, it is of great interest to identify signatures of these processes using GWs and/or electromagnetic observations. As a potential signature, we have focused on emissions from post-merger objects. We estimated the properties of breakout and shock cooling emissions from shocks that develop around jets and explosions generated by the merging remnants. We demonstrated that these emissions are typically bright in the optical to gamma-ray bands. We predict that the shock cooling emissions related to jets and explosions are detectable by observing thousands of AGNs with luminosities on the order of ˜10ˆ44-10ˆ45 erg/s and ˜10ˆ42-10ˆ43 erg/s, respectively. We then applied this model to interpret gamma-ray and optical flares that may be associated with GW events. I will present the current understanding and findings on this topic.

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