

Electromagnetic Signatures from Irradiated Circumbinary Disks in Binary Black Hole Systems

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Recent gravitational wave observations have detected several tens of mergers between stellar mass and likely intermediate-mass black holes (BHs). However, no clear observational evidence has yet been found for electromagnetic (EM) signals associated with such BH mergers or binary BHs. If a dense gas surrounds binary BHs, a circumbinary disk (CBD) can be formed. In such a case, the system consists of two mini-accretion disks around the secondary and primary BHs, respectively, with a CBD surrounding them, which serves as an EM emitter. In particular, the two mini-disks act as point-like UV/X-ray sources, irradiating the surface of the CBD. In this talk, we demonstrate how this irradiation affects the CBD spectrum and how the resulting irradiated CBD spectrum differs from the case of a single black hole. We also discuss the observational implications and the potential application of our model to supermassive BH binary systems.

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