

Compact objects around SMBHs: QPEs, FRBs and EMRIs

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In this talk, the GW and EM radiation from a compact object orbiting an SMBH are discussed. First, I will present a new formation channel of EMRIs with tidal disruption flares as EM counterparts. In this scenario, flares can be produced from the tidal stripping of the helium (He) envelope of a massive star by an SMBH. The remaining compact core of the massive star then evolves into an EMRI. Second, Quasi-periodic eruptions (QPEs), a new kind of X-ray burst with a recurrence time of several hours, have been detected from SMBHs in galactic nuclei. QPEs can be generated from the Roche lobe overflows at each periastron passage of an evolved star orbiting a SMBH. Third, the large rotation measures of some repeating FRBs indicate they are produced by neutron stars around SMBHs. In these above scenarios, low-frequency gravitational-wave EMRIs will be generated. The implication of joint detection of EMRIs and EM signals are discussed.

Primary author: Prof. WANG, Fayin (Nanjing University)

Presenter: Prof. WANG, Fayin (Nanjing University)

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