

# X-ray quasi-periodic eruptions: a potential electromagnetic counterpart of extreme mass ratio inspirals

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X-ray quasi-periodic eruptions (QPEs) are a new variability phenomenon observed around low-mass ( $M_{BH} < 10^7 M_{\odot}$ ) supermassive black holes. They appear as sharp and intense bursts of soft X-ray emission ( $E < 2$  keV), that last about one hour and repeat quasi-periodically every few hours. Each QPE emits a luminosity of  $10^{42-43}$  erg s<sup>-1</sup>, typically one order of magnitude above a much more stable quiescent flux level. So far they have been observed in eight galaxies, about a half of which are associated to tidal disruption events. Much work has been done on the theoretical side, but the physical explanation for the QPE appearance is not clear yet, as their phenomenology is quite complex. Among the possible explanations, significant attention has been drawn to the case of extreme mass ratio inspirals (EMRIs), where the secondary object – that could be a star or a black hole much smaller than the primary one – could either transfer mass or impact onto the inner accretion flow around the primary massive black hole. In this talk I will review the history of the discovery of the known QPEs and the theoretical explanations offered so far, with particular emphasis on the EMRI scenario(s) where QPEs could reveal to be the electromagnetic counterparts of gravitational wave sources detected in the future from space.

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