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Black-Hole Pulsar Binaries: Timing and Fluxes.

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Abstract content
 (Max 300 words)

Binary Pulsars have been identified as important laboratories for the study of gravitational physics. In particular, binary systems comprising a pulsar and a black-hole present a scenario for the study of physics in the strong gravitational field regime. We use a numerical simulation to predict the arrival times and relative fluxes from a pulsar in a binary system. We use numerical methods to solve the set of four coupled, second order ODEs describing the general relativistic motion of a photon in the Kerr space-time. Pulsar emission has been modelled by generating the necessary initial conditions for a large number of photons in a conical configuration. A sufficiently large number of these 'photon cones' are then used to describe a simple 'lighthouse-like' scenario, whereby the pulsar emits two conical beams in the plane of rotation. We evaluate an idealised case of a pulsar in a stable circular orbit around a significantly more massive black-hole, with the plane of rotation for the pulsar in the equatorial plane of the black-hole. In particular, we examine the superior and inferior conjunctions, with the hope of elucidating the theoretical behavior of a pulsar signal as seen by a distant observer.

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MSc

Main supervisor (name and email)
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Would you like to
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No

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