

Gamma-gamma absorption in gamma-ray binaries

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Gamma-ray binaries are a rare subclass of high mass binary systems, where the non-thermal emission peaks in the gamma-ray regime. Two scenarios have been proposed to explain the production of the emission; in the pulsar wind scenario the compact object is proposed to be a rapidly rotating pulsar, and the emission originates from particle acceleration that occurs at the shock that forms between the pulsar and stellar wind; in the microquasar scenario emission originates from the relativistic jet. In the pulsar wind scenario, acceleration would be most dominant at the apex of the shock, but hydrodynamic simulations have shown that a second shock could occur due to Coriolis forces. Since gamma-gamma absorption will strongly attenuate TeV emission originating from the apex of the shock, this may imply that it originates from this second shock region. We have undertaken a full calculation of the gamma-gamma optical depth around the known gamma-ray binary systems to investigate whether gamma-gamma absorption may introduce observable features that could be used to constrain the location of the gamma-ray production.

Abstract field

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