Contribution ID: **45** Type: **Poster Presentation**

Constraining the TeV Gamma-ray Emission Regions with Gamma-Gamma Absorption

Tuesday, 26 June 2018 15:00 (2 hours)

Gamma-ray binaries are a class of high-mass binary systems, which are distinguished by having spectral energy distributions which peak above 1 MeV. Gamma-ray binaries consist of a compact object, either a neutron star or black hole, orbiting a massive O or B type star. While there is some debate around how the gamma-rays are produced, in two systems, PSR B1259-63 and PSR J2032+4127, the compact object is known to be a young pulsar, and the gamma-ray production is due to particle acceleration in the shock that forms between the pulsar and stellar winds. It has been suggested by some studies that there may be different sights of particle acceleration in these systems, with the GeV and TeV emission being produced in different locations. Gamma-gamma absorption of the TeV emission could significantly modify the observed emission. This may provide a mechanism to constrain the location of the production of TeV gamma-rays. In this project we plan to model the effect of gamma-gamma absorption in all known gamma-ray binary systems, in order to investigate how this will modify the observed spectrum. This may be used to place constraints on the location when combined with the observations of the TeV emission. We will investigate this for the upcoming Cherenkov Telescope Array (CTA). We present the initial results from this project.

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Session Classification: Poster Session 1

Track Classification: Track D1 - Astrophysics