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X-ray binaries with the Fermi Large Area Telescope: a large scale survey in time and space.

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X-ray binaries present a particularly interesting class of gamma-ray emitter, with most emitting no detectable gamma-rays at all, and those that are detected falling into two distinct morphological classes: microquasars and gamma-ray binaries. Given the highly variable, and often faint, nature of these systems discovering them represents a unique challenge to the gamma-ray astronomy community, and a one size fits all approach fails to work for the majority of these systems.

We use 12.5 years of P8R3 Fermi-LAT observations, in addition to (when available) complementary AAVSO optical data and Swift-BAT X-ray data, to a detailed survey at the positions of approximately 300 X-ray binary systems. Spectral and variability analysis are carried out on a range of potential gamma-ray sources which are found to be coincident with the positions of the survey population.

We present initial results from our forthcoming works on this topic, and discuss the next steps to verifying whether any of these 300 systems can be confirmed as gamma-ray emitters.

We also discuss the challenges associated with a large data-driven project such as this, including statistical practices to avoid data dredging, and accounting for phenomena such as the Look-Elsewhere effect.

Keywords

X-ray binaries; gamma-rays, survey; Fermi-LAT

Collaboration

other Collaboration

Subcategory

Experimental Results

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