Multiwavelength Observations of Gamma-ray Binary Candidates

M. Virginia McSwain\textsuperscript{1}, Masha Chernyakova\textsuperscript{2}, Denis Malishev\textsuperscript{2}, Michael De Becker\textsuperscript{3}, Stephen Williams\textsuperscript{4}

\textsuperscript{1}Lehigh University, \textsuperscript{2}Dublin Institute for Advanced Studies, \textsuperscript{3}Université de Liège, \textsuperscript{4}Georgia State University

\textbf{Abstract}

There are currently only six known high mass X-ray binaries (HMXBs) that also exhibit MeV, GeV, and/or TeV emission (“gamma-ray binaries”). Expanding the sample of gamma-ray binaries and identifying unknown Fermi sources are currently of great interest to the community. Based upon their positional coincidence with the unidentified Fermi sources 1FGL J1127.7-6244c and 1FGL J1808.5-1954c, the Be stars HD 99771 and HD 168783 have been proposed as gamma-ray binary candidates. During Fermi Cycle 4, we have performed multiwavelength observations of these sources using XMM-Newton and the CTIO 1.5m telescope. We do not confirm high energy emission from the Be stars. Here we examine other X-ray sources in the field of view that are potential counterparts to the Fermi sources.

\textbf{Introduction}

About 60% of HMXBs are Be/X-ray binaries (BeXRBs) that contain a B-type star with a circumstellar mass-loss disk (a Be star) with a compact companion, usually a neutron star (Liu et al. 2006). Be star systems also comprise 50% of the known gamma-ray binaries: LS I+61 303, PSR B1259–63, and HESS J0632+057. The high energy emission is powered by either wind accretion onto the compact star, or by the collision of stellar and relativistic pulsar winds in a shock region (Dubus 2006). All of these sources present a unique opportunity to study particle acceleration in nearby, Galactic sources.

We have cross-correlated the 1FGL catalog (Abdo et al. 2010) with the Jaschek & Egret (1982) catalog of known Be stars, and we discovered two Be stars within the 95% error ellipse of 1FGL sources. Using XMM-Newton images, we find that the Be stars are not significant X-ray sources and are unlikely counterparts of the very high energy emission.

\textbf{References}

Jaschek, M. & Egret, D. 1982, IAU5, 98, 261

\textbf{Acknowledgements}

We gratefully acknowledge support from Fermi Cycle 4 through NASA grant NNX11AO41G. The CTIO 1.5m telescope is operated by the SMARTS Consortium.