Limits on Particle Acceleration by Black Holes in X-Ray Binaries

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A large body of theoretical work predicts the production of gamma-ray emission by stellar mass black hole canidates. We report on our effort to detect high-energy gamma-ray emission from a large sample of black hole candidates with the COMPTEL and EGRET telescopes. Our typical limits on gamma-ray luminosity from black hole candiates are L(1-30 MeV)= $10^{35} D_{kpc}^2$ erg/sec and L(>100 MeV)= $7 \times 10^{33} D_{kpc}^2$ erg/sec. The failure to detect Cygnus X-1, for example, limits the steady-state luminosity above 100 MeV to less than 10^{-4} of the Eddington luminosity for the system. We discuss the important constraints these observations place on particle acceleration in black hole binary systems.