GAMMA-RAY EMISSION FROM JETS IN GALACTIC MICROQUASARS

Sera Markoff (1,*), Heino Falcke (1), Rob Fender (2) and Peter L. Biermann (1)
(1) Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, 53121 Bonn, Germany, (2) Astronomical Institute 'Anton Pannekoek' and Center for High Energy Astrophysics, University of Amsterdam, Kruislaan 403, 1098 SJ Amsterdam, The Netherlands, (*) Humboldt Research Fellow.
smarkoff@mpifr-bonn.mpg.de

Strong evidence exists for the presence of powerful jets in the Low/Hard state of black hole candidate X-ray binaries, earning them the additional nomenclature "microquasars". In several of these sources, jets have been directly imaged, but all sources in the Low/Hard state show the flat-to-inverted radio spectrum which is the characteristic signature of optically thick synchrotron jet emission. This optically thick component can extend into the IR/optical, beyond which is a turnover to an optically thin regime. If indeed shock acceleration is present in the jet, as indicated by observations during flaring, this would account for the optically-thin power-law detected at higher frequencies. The high-energy cutoff of this power-law is determined by balancing cooling losses against acceleration, and could likely venture into the X-ray range. The same synchrotron-radiating energetic particles in the jet will also Compton upscatter external disk photons, as well as the synchrotron emission itself, resulting in a component that has the potential to extend into the γ-ray range. This is parallel to what is inferred from AGN, and thus these relatively nearby sources may serve as useful analogs for the study of cosmic ray acceleration and radiative processes in AGN, particularly in the limit of extreme cooling. We discuss the characteristics and detectability of this γ-ray emission, as well as a possible annihilation feature associated with jets impinging on dense gas, in the context of some Galactic microquasars.