Contribution ID: **370** Type: **Contributed talk**

Locating the blazar gamma-ray emitting zone from astrometric VLBI and Gaia data?

Tuesday, 5 July 2022 17:15 (15 minutes)

Although current emission models are generally able to account for the observed spectra of blazars from radio to TeV energies, unknowns remain on several fundamental questions such as the nature of the emitting particles, leptons or hadrons, the mechanism dominating the particle acceleration, and the origin of ultrafast variabilities. Some of the degeneracy between models could be removed by better localization of the gamma emission zone, which can be constrained but is not directly fixed by the low angular resolution gamma-ray data. Different locations can be considered such as the black hole magnetosphere, the radio core, the jet and knots detected in VLBI, or even more distant structures along the jets. Confronting the gamma-ray data with the very high precision absolute astrometry in the radio and optical ranges from the permanent geodetic VLBI program and the ESA Gaia mission should shed new light on this question.
We analyze a sample of about 816 active galactic nuclei (AGN) dominated by blazars, including a population of 214 BL Lacs and 488 FSRQs, cross-identified from the Gaia EDR3, the radio ICRF3, and the Fermi-LAT 4FGL catalogs. For a sub-sample of sources for which VLBI radio maps are available from the MOJAVE program, and within astrometric errors of less than 0.1 mas, most optical emissions (typically 90 %) detected by Gaia appear to be associated either with the VLBI radio core, or with a radio knot downstream in the jet at the parsec scale. We investigate the general trends of the main sample in terms of AGN classification, Gaia color indices, and GeV emission, and will discuss in particular the observed decrease of gamma-ray fluxes with the distance of the optical emission zone from the radio core, as well as the difference in behavior identified between the two populations of BL Lacs and FSRQs.

Primary authors: Mr PIERRON, Antonin (SYRTE); Dr LAMBERT, Sebastien (SYRTE); SOL, Helene (CNRS, LUTH, Observatoire de Paris)

Presenter: SOL, Helene (CNRS, LUTH, Observatoire de Paris)

Session Classification: Contributed Talks