Contribution ID: **316** Type: **Contributed e-poster**

Variable gamma-ray emitting NLS1 galaxies

Gamma-ray emitting narrow-line Seyfert 1 galaxies (NLS1) constitute an intriguing small population of Active Galactic Nuclei (AGN) with unexpected gamma-ray emission and debated fundamental properties, similar to low power flat-spectrum radio quasars (FSRQ). They are jetted, gamma/radio-loud Seyfert galaxies, with relatively low BH masses, accreting at exceptionally high, near-Eddington rates.
Two bona-fide NLS1 1H 0323+342 and PMN J0948+0022, and one intermediate object between NLS1 and FSRQ sub-classes B2 0954+25A are considered in this work. We analyzed quasi-simultaneous multiwavelength data for two different gamma-ray activity states and present the results of their broad-band SED modelling, complemented by a maximum number of physical constraints. Two different scenarios are discussed, in the framework of a one-zone leptonic model, where the high energy emission is due to the inverse Compton scattering of BLR (EIC-BLR) or torus (EIC-torus) photons by energetic electrons of the jet. While the EIC-torus emission seems to be dominant for PMN J0948+0022, the EIC-BLR scenario is preferred for 1H 0323+342 and B2 0954+25A. We show that the transition from low to high state is well described by minimal changes in the jet parameters, favoring the stationary shock scenario at the origin of the particle acceleration. We use the multi-epoch modelling to characterize the total jet powers and discuss the intrinsic nature of gamma-ray emitting NLS1 galaxies.

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Session Classification: Contributed posters