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Transition from low to high activity states in gamma-ray emitting NLS1 galaxies

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Gamma-ray-emitting narrow-line Seyfert 1 galaxies (NLS1) constitute an intriguing small population of Active Galactic Nuclei (AGN) with debated fundamental properties, unexpected gamma-ray emission and anomalous variability features, possessing 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 gamma-ray activity states. 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 or torus photons by energetic electrons of the jet. Using a maximum number of physical constraints such as the jet opening angle, causality and energetic arguments, 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. The correlation between radio and gamma-ray emission is explored to investigate the origin of the variability. The intrinsic nature of these sources and their place in the AGN classification are discussed.

Field

Compact objects (supernovae, black holes, neutron stars)

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