

SPECTROSCOPIC OBSERVATIONS OF UNDETERMINED TYPE γ -RAY ACTIVE GALACTIC NUCLEI

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During its first four years of operations, the *Fermi Large Area Telescope* (*Fermi/LAT*) detected 3033 γ -ray sources above a 4σ significance level. Although most of the extra-Galactic sources are active galactic nuclei (AGN) of the *blazar* class, other families of AGNs are observed too, while a still high fraction of detections ($\sim 30\%$) remains with uncertain association or classification. According to the currently accepted interpretation, the AGN γ -ray emission arises from inverse Compton (IC) scattering of low energy photons by relativistic particles confined in a jet that, in the case of blazars, is oriented very close to our line of sight. Taking advantage of observations carried out at radio and X-ray wavelengths, which provide a much better source localization potential, we focussed our attention on the extra-Galactic γ -ray sources of still undetermined type, starting a campaign of optical spectroscopic observations. The main aims of our investigation include a census of the AGN families that contribute to γ -ray emission and a study of their redshift distribution, with the subsequent implications on the intrinsic source power. We furthermore analyze which γ -ray properties can better constrain the nature of the source, thus helping in the study of objects not yet associated with a reliable low frequency counterpart. In this communication we report on the instruments and techniques used to identify the optical counterparts of γ -ray sources, we give an overview on the status of our work, and we discuss the implications of a large scale study of γ -ray emitting AGNs.