

Celebrating 20 years of Swift Discoveries



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THE NATURE OF EXTRAGALACTIC UNIDENTIFIED GAMMA-RAY SOURCES (UGS): THE KEY ROLE OF SWIFT/XRT

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Over the past decade, the Swift satellite carried out a dedicated observational campaign targeting unassociated gamma-ray sources (UGSs), which constitute ~30% of the gamma-ray detections reported by the Fermi satellite. UGSs are of significant interest in high-energy astrophysics, potentially hiding new unidentified blazars, the most numerous class of extragalactic gamma-ray sources and possible neutrino emitters, or other types of AGNs. To unveil the nature of these sources, we performed a multiwavelength analysis using all available Swift/XRT images covering the error box region of ~750 UGSs, in order to identify their lower energy counterparts. We used ~160 hours of optical observations with 8-10m class telescopes to classify the UGS optical spectroscopic counterparts.

From the analysis of their spectral properties we determine the redshift or establish stringent lower limits. This comprehensive study enables the classification of UGSs, as well as the construction and characterization of their broadband spectral energy distributions (SEDs), particularly in the X-ray band. These results allow to address important scientific questions such as the blazar demographics and evolution, the mechanisms underlying photon and neutrino production, and the identification of possible gamma-ray non-blazar sources (like quasars and Seyferts) as well as promising candidates for TeV gamma-ray emission.

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