SPECTRAL PROPERTIES OF 3EG GAMMA-RAY SOURCES OUTSIDE THE GALACTIC PLANE

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Introduction

The Third EGRET catalog lists 74 unidentified sources within |b| < 10° and 96 unidentified sources at high galactic latitudes. The identified objects at high galactic latitudes are 93 AGN, a radio galaxy and the Large Magellanic Cloud. Although various studies of unidentified sources at high galactic latitudes suggest a large fraction to be additional AGN, simply not yet detected or classified as such in optical or radio wavelengths. Other predictions are nearby radio-quiet neutron stars, which could be thought of a homogeneous population seen from earth, therefore including sources at high galactic latitudes.

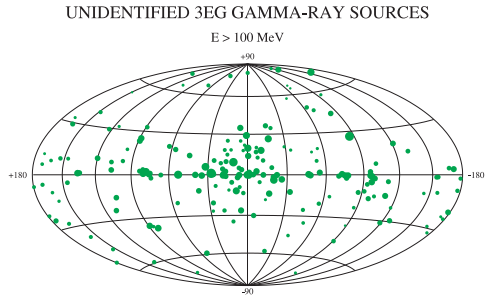

Fig. 1 All-Sky distribution of 3EG unidentified sources, covering four years CGRO observations

While only spectral indices from a single power-law fit were referenced in the 3EG catalog, the details in the determined spectra of some individual gamma-ray sources are not revealed this way. As a reference, the spectra of the EGRET sources at high galactic latitudes will be given in the ten standard EGRET energy intervals (30-50, 50-70, 70-100, 100-150, 150-300, 300-500, 500-1000, 1000-2000, 2000-4000, 4000-10000 MeV). If the statistics prevents the determineation of a meaningful spectrum in ten energy band separation, combinations will be used, i.e. 30-100,100-300,300-1000, and 1000-10000 MeV. Four years of AGN observations are already covered in Mukherjee et al. 1997, therefore they should not be subject of this study. However, their spectral characteristics throughout the four years of EGRET observations in total and in individual viewing periods will be used for comparison with the spectra we derived here.

Our current sample consists of 46 unidentified sources with |b| > 10°. This subset is determined from the total 96 high-lat unidentified sources by applying the common detection threshold criterium of 4 σ in the total four years (phase 1 to 4) superposition of EGRET data. This secures sufficient counts for our attempt to determine structured spectra.

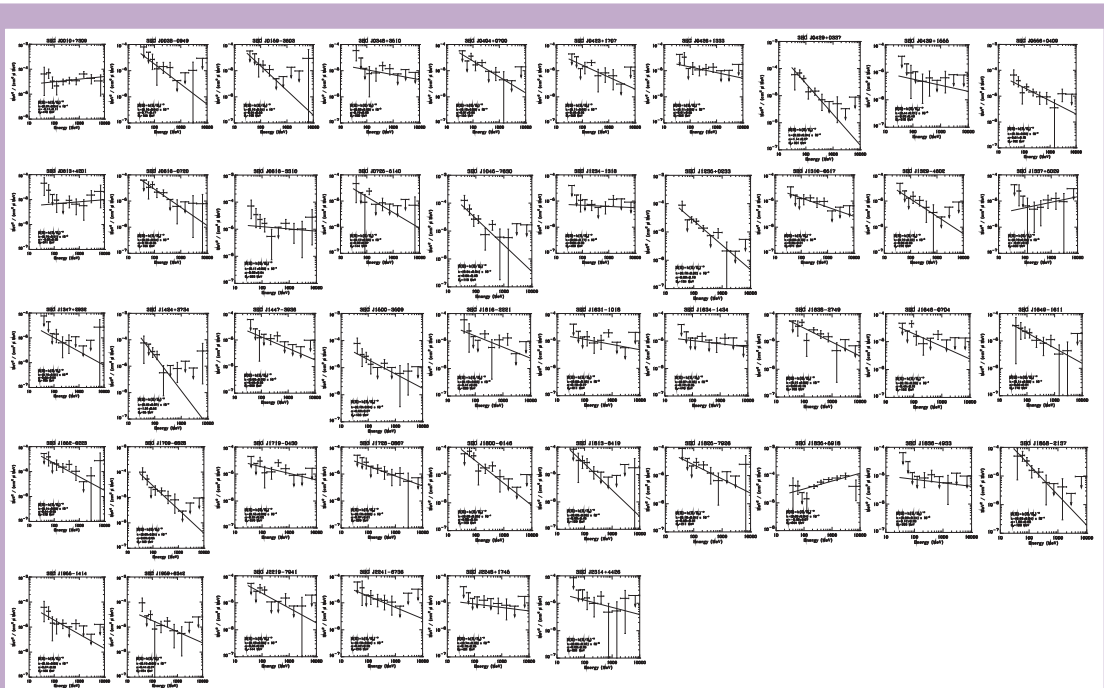

Fig.2 Individual EGRET spectra of unidentified sources (|b| > 10°, detection threshold > 4 σ in CGRO phase 1 to 4)

Discussion

One reason to investigate the individual spectra of unidentified sources at high galactic latitudes was triggered by the indication, that some of the spectra of EGRET detected blazars are improperly fitted by use of a single power-law (spectral cut-offs!). In this sample, we only have two sources with rather hard gamma-ray spectrum: 3EG J0010+73 and 3EG J1835+59 (!). In contrast, a significant number of sources is characterized by a very soft gamma-ray spectrum, often below the instrumental sensitivity in the high energies. For those sources, alternative fits were not applicable (exception: 3EG J0616-33). However, this study will be continued by investigating the source spectral in individual observations (vp's).

References

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