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Radio Observation of the 11-Month Fermi-AGN at Urumqi Observatory

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Abstract. We carry out flux observation at 5 GHz for 124 sources from the 'clean' sample of Fermi catalog 1LAC (The First LAT AGN Catalog) with Urumqi 25 m telescope. We find that it is obvious that there is a correlation between the γ-ray and the radio flux density for blazars. For the subclasses, the correlation for FSRQs is strong, but the correlation for BL Lacs is weak.

Key words. Fermi-LAT—AGN—γ-ray—radio.

1. The sample and observation

From the 'clean' sample of the 11-month Fermi-AGN catalog 1LAC (The First LAT AGN Catalog, Abdo *et al*. 2010), we defined a sample with declination more than 0, which consists of 189 BL Lacs, 132 FSRQs, 18 AGNs of other types and 19 AGNs of unknown type without optical classification. The observations in May, July and August 2010, were made with the 'cross-scan' method. The data were calibrated with pointing error and antenna gain, and flux density was scaled using Ott *et al*. (1994) system. Many sources were not well observed for bad weather or weak flux, so finally we obtained results for 124 sources consisting of 69 FSRQs, 40 BL Lacs, 10 other types and 5 AGNs of unknown type.

2. Result and discussion

We list the ranges of the radio flux densities (unit: Jy) for FSRQs and BL Lacs in Table 1, in which we show that FSRQs are stronger than BL Lacs at 5 GHz in mean values. And also the γ-ray flux (1–100 GeV) of FSRQs are larger than that of BL Lacs with mean values of 4.5 and 3.5 in the unit of 10^{-9} photons cm^{-2} s^{-1}, respectively.

We find a correlation between radio flux and γ flux above 1 GeV, with Pearson correlation coefficient of 43% and significance $P = 3.3 \times 10^{-6}$ for the blazars. For the subclasses, a correlation coefficient of 47% with $P = 5.5 \times 10^{-5}$ for FSRQs, and a correlation coefficient of 19% with $P = 0.2$ for BL Lacs is seen in Fig. 1. The upper results show that the correlation between γ-ray and radio is stronger in FSRQs than in BL Lacs. There may be some bias for the results due to differential redshifts, and there may be better results if the radio and γ data are simultaneous. The physical mechanism behind the correlations needs to be expounded in future.

Table 1. Statistics of the radio sources.

Type	*N*	Mean	Minimum	Maximum
FSRQ	69	1.2889	0.1820	12.2345
BL Lac	40	0.9099	0.1035	4.2280
Other types	10	9.3749	0.1700	67.8705
Unknown type	5	0.3181	0.1900	0.5725

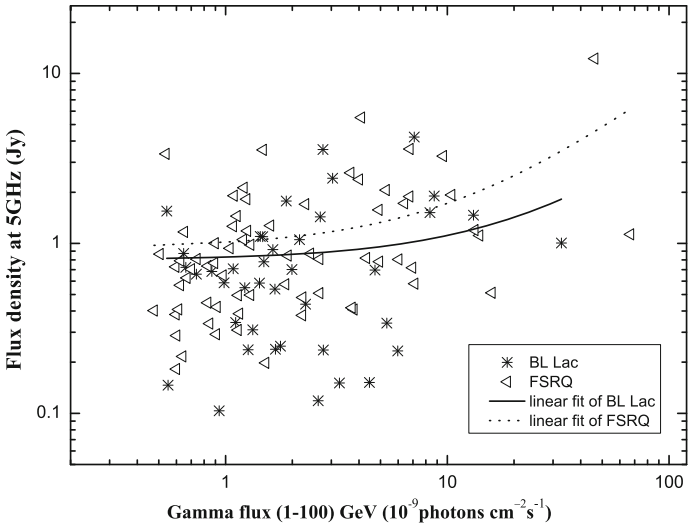

Figure 1. The correlations between Gamma flux and radio flux density.

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References

Abdo, A. A. *et al.* 2010, *Astrophys. J.*, **715**, 429.
Ott, M. *et al.* 1994, *Astron. Astrophys.*, **284**, 331.