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Roma-BZCAT: a multifrequency blazar catalogue

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Abstract. We present a new catalogue of blazars based on multi-frequency surveys and on an extensive review of the literature. It is useful for the identification of the extragalactic sources that will be detected by present and future experiments for X and γ-ray astronomy, like Swift, AGILE, GLAST and SIMBOL-X. An electronic version is available from the ASI Science Data Center web site at http://www.asdc.asi.it/bzcat. The catalog presently includes objects between R.A.= 0h and 16h; the full sky is expected to be available by the end of 2007.

Key words. Galaxies: active: Blazars, BL Lac objects – Catalogs:

1. Introduction

A Blazar can be defined as an *Active Galactic Nucleus whose emission is dominated by non-thermal radiation, amplified by relativistic effects*. Many surveys have been carried out to identify new Blazars and their number is continuously increasing. Nevertheless, only a relative small number of Blazars have been studied intensively. Because of their very broad spectral emission, Blazars are expected to play an important role in the generation of the extragalactic background and of its fluctuations in several energy bands.

Blazars constitute the most numerous class of extragalactic γ-ray sources. A good knowledge of the Blazar population is, therefore, very relevant to high energy astrophysics. For this reason a complete list of Blazars, based on an accurate examination of literature data, can be very useful for carrying out some of the scientific goals of a mission like SIMBOL-X. We describe here the present status of the "Multifrequency Blazar Catalogue", also named *ROMA-BZCat*, that is available on-line at the ASDC web site and that is continuously updated and extended.

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2. The *ROMA-BZCat*

The *ROMA-BZCat* (Massaro et al. 2005) is mostly based on previously published catalogues of Active Galactic Nuclei, but also includes many sources from recent surveys and other publications. Blazars must be characterized by the presence in the SED of significant non-thermal emission covering a broad frequency interval and associated with a (often variable) nuclear activity. A detection in the radio, optical and X-ray bands is our basic selection criterion. For the X-ray data, however, we adopt less stringent criteria because a very distant or a low luminosity source could be undetected in the ROSAT survey. Recent observational campaigns with the $Swift-XRT$ telescope on samples of BL Lacs and FSRQs without measured X-ray fluxes confirmed that they emit X rays with an intensity in agreement with that of similar Blazars (P. Giommi et al. 2007, in preparation).

The catalog is structured into two parts. Part 1, at present the only one available on-line, contains the lists of Blazars, which are classified in three groups, according to their spectral properties, Part 2 contains the SEDs of some interesting sources. Each Blazar is identified by a three-letter code followed by its truncated equatorial coordinates (J2000). The codes are: **BZB**: BL Lac objects, for AGNs with a featureless optical spectrum, or having only absorption lines of galaxian origin and weak narrow emission lines; **BZQ**: Flat Spectrum Radio Quasars, with an optical spectrum showing broad emission lines and dominant Blazar characteristics; quasars having a radio spectral index between 1.4 and 5 GHz steeper than 0.5 were not considered as flat spectrum sources and are not included in the catalog, unless there are other indications for Blazar activity, as variability and high polarisation; **BZU**: Blazars of Uncertain type, adopted for a small number of sources having peculiar characteristics but also showing Blazar activity. BZB objects are listed in the first two Tables of the catalog (but they are not distinguished in the on-line version): Table 1 contains all firmly identified BL Lacs, whereas Table 2 includes *candidate BL Lac objects*, i.e. sources for which optical spectra are not available either in literature or on the web. BZQ and BZU sources are listed in Table 3 and 4, respectively.

3. Conclusion

The scientific goals of the *ROMA-BZCat* are: *i*) to have the most complete and verified list of published Blazars; *ii*) to search for counterparts of high energy extragalactic sources; *iii*) to have a population from which it will be possible to extract samples satisfying statistical criteria to investigate Blazar properties and evolution; *iv*) to have a large database of SEDs for different types of Blazars to study radiation mechanisms and relativistic beaming effects.

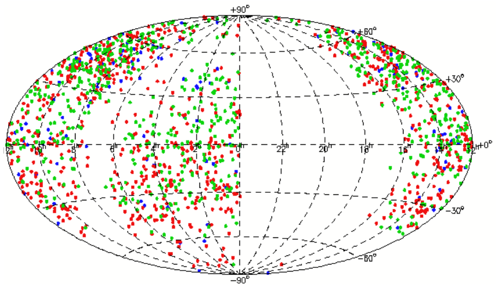

Fig. 1. Aitoff projection in equatorial coordinates showing the distribution of Blazars in the RA interval 0.0h – 16.0h.

An open problem is that of the completeness of the catalogue: there is, in fact a deficiency of Blazars in the southern sky because of the smaller number of surveys in comparison to the northern hemisphere. Many newly discovered Blazars and candidates, for instance, have been identified using spectroscopic observations from the SDSS.

The catalogue will be published in four volumes, each containing Blazars in a six hour Right Ascension interval. The first one was printed in 2005 and the second will be available soon. The on-line version of the catalogue gives the general Tables and, for each source, the links to the most important catalogues and databases. It is continuously updated and will be completed by the end of 2007.

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References

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