PHYSICAL CHARACTERISTICS OF THE ICRF2 SOURCES

A.-M. GONTIER, S. B. LAMBERT
Observatoire de Paris/SYRTE/CNRS/UPMC
61 av. de l'Observatoire 75014 Paris

1. INTRODUCTION

This paper summarizes the way we obtained the physical information on the ICRF2 radio sources. This information includes the object type, redshift, 8.4 GHz and 2.3 GHz fluxes, spectral index, visual magnitude, a classification of spectrum, and comments. The physical characteristics are made available in ASCII format at the International Celestial Reference System Product Center (ICRS-PC) of the International Earth rotation and Reference systems Service (IERS) at:

`http://hpiers.obspm.fr/icrs-pc`

under the section "Information on radio sources".

2. INFORMATION RETRIEVAL FROM CATALOGUES AND DATA BASES

The physical characteristic were obtained from the following primary catalogues or compilations:

- The Large Quasar Astrometric Catalogue (LQAC, Souchay et al. 2009) is a compilation of 12 of the largest quasar catalogues (4 from radio interferometry programs, 8 from optical surveys). It contains 113,666 quasars, providing information when available on: u, b, v, g, r, i, z, J, K photometry as well as redshift, radio fluxes at 1.4 GHz, 2.3 GHz, 5.0 GHz, 8.4 GHz, 24 GHz, and redshift references,
- Malkin & Titov (2008, hereafter referred to as MT08) includes 4,261 radio sources with J2000.0 coordinates, redshift, V magnitude, object type and comments,
- Véron-Cetty & Véron (2006, hereafter referred to as VV06) provides a list of 85,221 quasars, 1,122 BL Lac objects and 21,737 active galaxies together with known lensed quasars and double quasars,
- Healey et al. (2007, hereafter referred to as H07) publishes precise positions, sub arc second structures, and spectral indices for some 11,000 sources, and
- Stickel et al. (1989–1993), referred to as S89, provides position, magnitude, type of the optical identification, flux at 5 GHz and two-point spectral index between 2.7 GHz and 5 GHz.

Essentially, the table of radio source physical characteristics has been derived by sequentially obtaining data using these five references. The steps were as follows:

1. The LQAC was used to provide information on flux at 8.4 GHz and 2.3 GHz and initial information for the redshift and the magnitude.
2. A comparison was made with the MT08 catalogue. Matches were done by IERS name. In this comparison, information on object type and comments was brought in. The redshift and the magnitude were checked and such data were provided for some sources. Most of the found discrepancies are explained by the comments.
3. The VCV06 data were merged in a similar fashion. At this stage, the object type was refined and the classification of spectrum was added.
4. Spectral index data between low frequency and 8.4 GHz were taken from the H07 catalogue and completed for 7 sources by the S89 catalogue.

Table 1: Table giving the number of ICRF2 sources for which physical informations are available.

	Redshift	Magnitude	Spectral Index	Flux
Redshift	1,571			
Magnitude	1,354	2,012		
Spectral Index	1,292	1,682	2,543	
Flux	1,459	1,840	2,317	3,051

This research has made use of the NASA/IPAC Extragalactic Database (NED) which is operated by the Jet Propulsion Laboratory, Caltech, under contract with the National Aeronautics and Space Administration. This research has also made use of the Virtual Observatory tool TOPCAT.

3. CONCLUDING REMARKS

An important part of the redshifts, magnitudes and spectral indices is still missing and observation programs must be undertaken to complete the ICRF2 information. The permanently updated database of MT08 and the upcoming version 2 of the LQAC will be of interest for an update in a near future. Regular VLBI monitoring of sources with poor observational history must also be scheduled.

4. REFERENCES

Souchay, J., Andrei, A. H., Barache, C., et al. 2009, The Large Quasar Astrometric Catalog (LQAC), A&A, 494, 799

Malkin, Z., & Titov, O. 2008, Optical Characteristics of Astrometric Radio Sources, In: A. Finkelstein and D. Behrend (Eds.), Measuring the Future, Proc. Fifth IVS General Meeting, 183

Véron-Cetty, M.-P., Véron, P.2006, Quasars and Active Galactic Nuclei (12th Ed.), A&A, 455, 773

Healey, S. E., Romani, R. W., Taylor, G. B., et al. 2007, CRATES: An All-Sky Survey of Flat-Spectrum Radio Sources, ApJ Suppl. Ser., 171, 61

Stickel, M., Fried, J. W., & Kuehr, H. 1989, Optical spectroscopy of 1 Jy BL Lacertae objects and flat spectrum radio sources, A&A Suppl. Ser., 80, 103

Stickel, M., Kuehr, H., & Fried, J. W. 1993, Spectroscopy of 1 Jy and S5 radio source identifications, A&A Suppl. Ser., 97, 483

Stickel, M., Fried, J. W., & Kuehr, H. 1993, The complete sample of 1 Jy BL Lac objects. II - Observational data, A&A Suppl. Ser., 98, 393