Chin. J. Astron. Astrophys. Vol. 1, No. 1, (2001) 46–49
(*http://www.chjaa.org* or *http://chjaa.bao.ac.cn*)

Chinese Journal of
Astronomy and
Astrophysics

Optical Identifications of X-ray Selected AGNs

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Received 2000 July 14; accepted 2000 December 13

Abstract For investigating the statistical properties of X-ray selected Active Galactic Nuclei (AGNs), we have carried out a program of optical identification of a selection of X-ray sources from ROSAT All Sky Survey Bright Source Catalogue (RASS-BSC) using the 2.16 m telescope of Beijing Astronomical Observatory (BAO). In the preliminary observations, 23 new AGNs were discovered, of which 9 are quasars, and 14 are Seyfert galaxies.

Key words: X-rays: galaxies – galaxies: quasar – galaxies: Seyfert

During the ROSAT All-Sky Survey (RASS; Voges 1992, 1997) about 80,000 X-ray sources with a detection likelihood ≥ 10 were detected, from which 18,811 sources having a PSPC count rate larger than 0.05 cts s^{-1} and detection likelihood ≥ 15 were compiled in the RASS-BSC (Voges et al. 1996a). More than 65% RASS sources remain unidentified (Voges et al. 1996b). The optical spectroscopic study of these RASS sources is essential for understanding them more clearly.

The identification of X-ray sources has proved to be an effective means of creating samples of AGNs. In order to investigate the statistical properties of X-ray selected AGNs, we have carried out a program on the optical identification of a new bright sample of AGNs which have the highest X-ray-to-optical flux ratios in the RASS-BSC. During the preliminary observing runs for testing the selection criteria, a series of new AGNs not included in the sample were discovered from the RASS-BSC, in which 9 are quasars, and 14 are Seyfert galaxies. None of these are in the 1998 Véron- Véron catalogue (Véron-Cetty & Véron 1998).

The low resolution spectra of the X-ray sources were taken with the BAO 2.16 m telescope and the OMR spectrograph, using a Tektronix 1024×1024 CCD as detector. Two gratings of 300 g mm^{-1} and 150 g mm^{-1} were employed in order to get a large wavelength coverage. All observations were made through a $2.3''$ slit which produced a resolution of 10 to 11 Å and 20 to 22 Å. The raw two-dimensional data were reduced following standard procedures using the IRAF program package.

Table 1 summarizes the optical properties for the new AGNs. The optical right ascensions and declinations were obtained from USNO-A1.0. We applied these coordinates to the Digitized

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Table 1 Optical Properties of the New AGNs

ROSAT Name (1RXS J)	RA (2000)	Dec. (2000)	B	R	z	M_B	Type
001201.7+290324	00:12:01.9	29:03:22.6	16.6	16.7	0.276	–24.6	Quasar
003352.3+202112	00:33:52.7	20:21:04.2	17.3	17.1	0.232	–23.5	Quasar
004649.4+152741	00:46:50.0	15:27:53.5	15.4	14.7	0.082	–23.1	Quasar
013802.1+213606	01:38:02.2	21:36:12.4	16.1	15.2	0.045	–21.1	Seyfert
020429.4+031936	02:04:29.2	03:19:34.5	17.3	17.0	0.119	–22.0	Seyfert
021121.1+193827	02:11:20.8	19:38:25.3	15.7	14.3	0.068	–22.4	Seyfert
030007.6+163023	03:00:08.0	16:30:14.3	15.0	13.5	0.038	–21.8	Seyfert
030145.1+011538	03:01:44.2	01:15:31.1	16.3	15.4	0.084	–22.0	Seyfert
031044.0+323933	03:10:44.4	32:39:29.0	17.0	15.4	0.127	–22.5	Seyfert
053609.5+822314	05:36:07.2	82:23:13.1	14.8	13.7	0.051	–22.6	Seyfert
081749.0+025104	08:17:49.2	02:50:59.7	15.1	15.1	0.106	–24.0	Quasar
082209.5+470601	08:22:09.5	47:05:53.2	17.0	12.7	0.130	–22.5	Seyfert
084804.6+393404	08:48:04.2	39:34:04.3	17.7	17.3	0.170	–22.4	Seyfert
091345.4+474208	09:13:46.1	47:42:00.3	13.7	12.1	0.053	–23.8	Quasar
091528.1+784146	09:15:26.3	78:41:46.4	16.4	16.4	0.107	–22.7	Seyfert
100014.7+503700	10:00:13.4	50:36:46.1	17.9	17.0	0.238	–23.0	Quasar
102553.5+401301	10:25:53.6	40:12:43.9	16.6	16.6	0.407	–25.4	Quasar
122310.7+474429	12:23:11.5	47:44:27.0	15.5	15.1	0.163	–24.6	Quasar
123235.8+060315	12:32:35.9	06:03:10.1	16.5	15.1	0.085	–22.1	Seyfert
124726.4+070522	12:47:26.4	07:05:24.9	17.1	16.5	0.107	–22.0	Seyfert
124828.1+083103	12:48:28.5	08:31:12.7	17.7	16.6	0.120	–21.6	Seyfert
181016.1+364559	18:10:16.4	36:46:01.9	17.6	17.4	0.159	–22.4	Seyfert
214532.2+110255	21:45:32.8	11:02:55.3	17.5	17.4	0.209	–23.1	Quasar

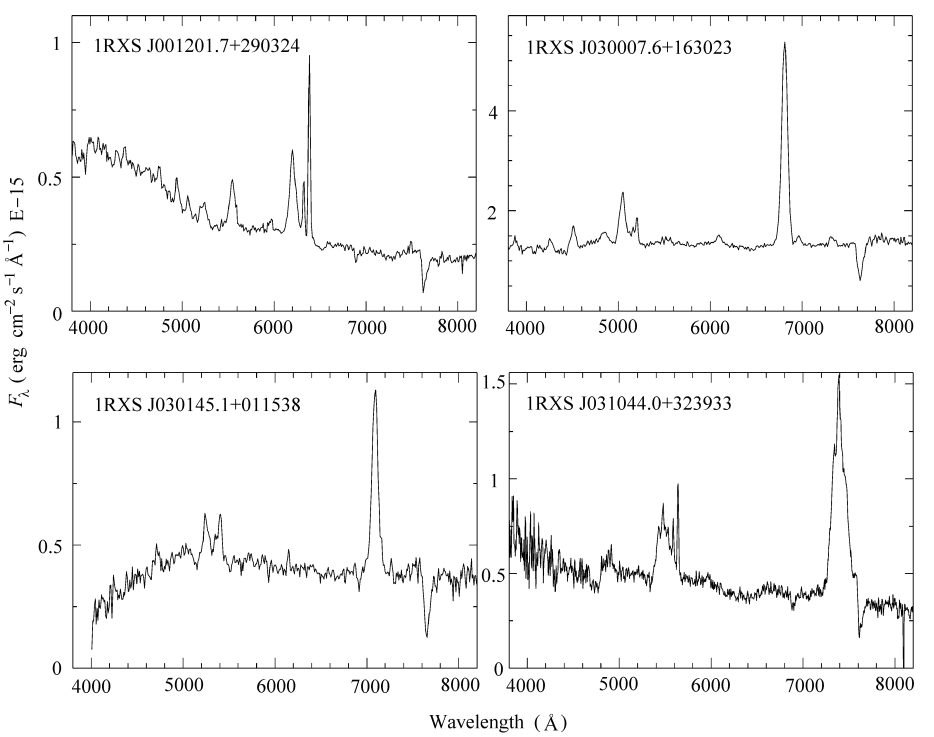

Fig. 1 Spectra of some new AGNs

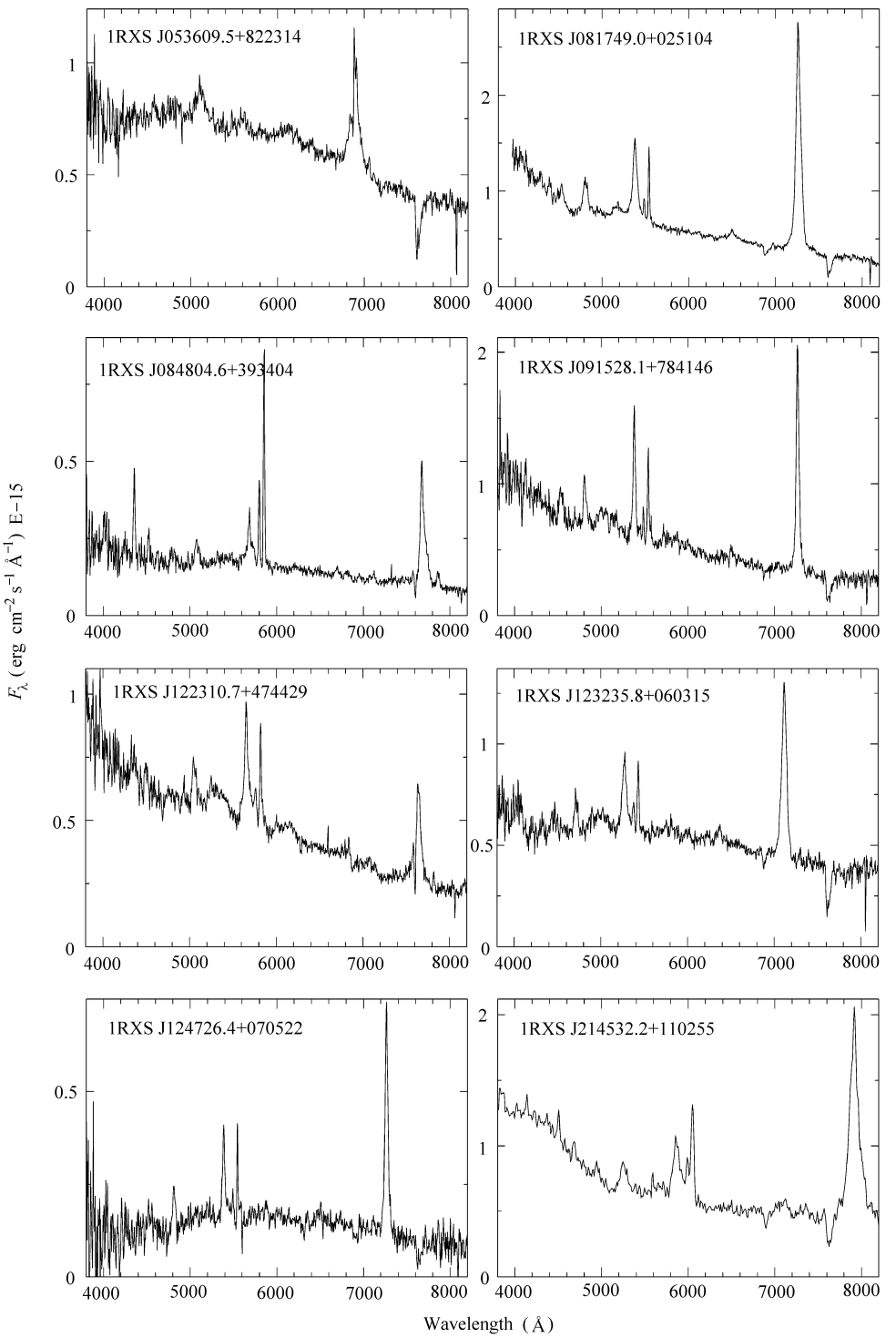

Fig. 1 (Continued)

Sky Survey and did not find any ambiguous identifications of the objects. The B and R magnitudes were derived from USNO-A1.0 and have an accuracy between 0.25 and 0.40 magnitudes depending on the declination (Monet et al. 1996). The average redshifts were usually determined from two or more emission lines. The absolute B magnitudes were calculated assuming $H_0 = 50\,\mathrm{km\ s^{-1}\ Mpc^{-1}}$, $q_0 = 0$. The spectra are shown in Fig. 1.

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