АСТРОФИЗИКА

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A NEW SAMPLE OF CANDIDATES GPS SOURCES

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Three types of extragalactic radio sources are well-known. (I) Extended sources with steep spectra, $\alpha > 0.5$ ($S \sim \nu^{-\alpha}$) and sizes > 100 kpc. (II) Compact nuclear sources with flat spectra, $\alpha < 0.5$ and sizes < 1 pc. (III) Compact sources with steep spectrum (CSS), $\alpha > 0.5$, with linear sizes smaller than a galaxy typical diameter (~25 kpc). The size of CSS sources are in order of typical sizes of the optical narrow emission line region (~1 kpc). The spectra of many CSS sources has turnover at low frequency, near 100 MHz.

Recently high attention has been devoted to the so-called "gigahertz peaked spectrum" (GPS) radio sources with exhibit a clear peak near 1 GHz (0.5-5 GHz). The nature of these sources and their relationship to compact and extended radio sources is not clear yet. The properties of these objects, as stressed by O'Dea et al [1] are: (I) peaked radio spectra with narrow spectral shape and steep high frequency spectrum, (II) low radio polarization, (III) high radio luminosity (~10^{45} erg s^{-1}) (IV) very compact radio structure.

It is now clear, that the family of GPS sources is a mix of galaxies and quasars. They frequently are associated with high redshift objects [2, 3]. The great potential of GPS sources to discover high z objects is the major motivation for enlarging of the sample of GPS sources. First list of 25 GPS objects has been published by Gopal Krishna et al [3]. Later publications by different authors [1,4-8] enlarged the number of candidates GPS to 141.

In the present paper we extend the lists of candidate GPS sources, using a sample of 39 sources selected from first 10 published Ooty lists ([9] and references therein). The spectra of the Ooty radio sources have been determined by observing them simultaneously at 968, 2300, 3660, 3950 and 7700 MHz, with the RATAN-600 radio telescope, which gave an adequately large frequency range 24:1.

The measurements of the flux densities at 968, 2300, 3660, 3950 and 7700 MHz were carried out by myself at RATAN-600 for 307 of the total 930 Ooty radio sources ($b^{II} > 10°$). The observed sample has a median value of S_{327}=0.7 Jy and an optical identification rate of 56%. The optical identifications have been done on the base of prints of the Palomar Observatory Sky Survey (POSS). Optical positions of all the objects were measured with an accuracy of 0.5 arcsec, and their photographic magnitudes are accurate within 1^m [9]. The spectra of these sources were derived by combining our RATAN-600 flux densities with the S_{327} taken from the Ooty lists using additional flux densities available from the literature. All flux densities were converted to the scale of Baars et al [10]. Details of these observations and the spectra of Ooty radio sources are presented by Ohanian and Panajian [11, 12] and Ohanian [13]. We found that among these 307 sources 39 (13%) can be candidates of GPS sources (S_{327min} = 0.5 Jy). Five of them were included in the Gopal Krishna et al sample [3]. The sources, whose peaked spectrum may be due to confusion, are excluding from the sample. Our sample of GPS sources, together with data published by other authors, enlarged the number of known GPS source candidates to 175 objects.

The 327 MHz flux densities of a observed sample of 307 sources lie in the range of 0.2-4.3 Jy with a median value of 0.7 Jy. 136 (44%) of them are EF (m_{PS}>21^m on the POSS prints). The magnitudes of remaining optical identified objects lie in the range of 11-21^m, with a median value of 19^m . The fluxes of 39 candidate GPS sources lie in the range of 0.25-2.4 Jy with a median value of 0.5 Jy. 19 (48.7%) of them are EF, the magnitudes of remaining optical identified objects lie in the range of 16-21^m with a median value of 19.5^m. The comparison these values for observing sample and for 39 candidate GPS sources show, what GPS type objects are frequently found among the fainter objects both in radio and optical range. This can be another indication that sample of GPS type sources might be rich by objects at high redshifts.

From observed sample of 307 sources 9 are identified as BG (blue galaxies), 4 (44.4%) of them are GPS sources. From 25 identified RG (red galaxies) the GPS type of sources are default. We have examined the spectra of fainter radio sources ($S_{1.4GHz}$< 50^mJy) from Leiden - Berkeley Deep Survey (LBDS) presented by Oort [14]. It is shown, that from 13 blue radio galaxies (z =0.3-0.7), 8 (61.5%) appear to be GPS sources. From 6 red radio galaxies only one (16.7%) is true GPS source. It seems, that GPS type sources to be frequently associated with galaxies of blue colour.

Новая выборка радиоисточников с пиком в спектре в гигагерц диапазоне. Представлена новая выборка радиоисточников с пиком в спектре в Гегагерц диапазоне (ГПС). Наша выборка, вместе

с данными, опубликованными другими авторами, увеличивает число кандидатов в ГПС до 175.

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