

Deep RATAN-600 Surveys at the Declination of SS433 Carried Out in 1987-2000 at 7.6 and 2.7 cm

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Abstract. New interest have appeared recently in observations of radio sources at the shortest radio wavelengths in connection with planned searches CMB radiation. A high sensitivity 2.7 cm receiver was installed at RATAN-600 in 1989. We discuss the results of deep surveys (“Cold”) of a $\pm 10'$ strip of the sky centered on the declination of SS 433 covering an interval of 11^h in R.A. carried out with the RATAN-600 telescope at 2.7 and 7.6 cm in 1987–2000.

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The survey objects were cross identified with NVSS sources catalog (21 cm) and two frequency indices $\alpha_{7.6}^{21}$ were found. About 600 radio sources at 7.6 cm were identified with NVSS objects, but only about 60 objects at 2.7 cm. and 50% of two-frequency spectra have standard power-law and more about 25% have spectra with rise toward higher frequencies. Of the 3 objects detected at both 3.94 and 11.11 GHz, but absent in NVSS catalog, one is in the GB6 catalog (4.85 GHz) while the other two are too weak for GB6. There is a flatter of a mean two frequency spectral indices with decreasing 21 cm flux density from $S_{21} < 30$ mJy to flux densities $15 < S_{21} < 30$ mJy (Fig.1a). This may be related to an appreciable decrease in the fraction of FR II objects with steep spectrum. Fig.1b presents a $\log N - \log S$ curve for at 2.7 cm for all objects detected at 7.6 and 2.7 cm and identified with NVSS objects. This curve at 2.7 cm shows a bend at flux densities of ~ 300 mJy and obeys a “3/2” law at $S > 300$ mJy. The slope of this curve at $S < 300$ mJy approximately coincides with the slope at 21 cm. We used the derived spectra to estimate the number of objects expected at 30 GHz which turned out to be close to direct counts at 31 GHz. We confirm a small role of any new source populations at 30 GHz for, invisible by NVSS and danger for PLANCK sensitivity limit.

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