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Broadband radio properties of the FR0 radio galaxies.

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The modern radio sky surveys have shown that compact radio sources, so named FR0 radio galaxies, are the majority among radio loud active galactic nuclei of the local Universe. The numerous FR0 population have to make a significant contribution to cosmic background emissions. These sources have mildly relativistic jets at parsec scales despite lack of prominent extended kpc radio structures. At the same time FR0s are a γ-ray emitting population as it was established recently. The issue about FR0s nature and their evolution status is open. There is a deficit of radio continuum measurements FR0s until recently. We present the study of 34 FR0s properties at the centimeter range based on monitoring data RATAN-600 in 2020-2024. We show that most of these objects have flat and convex radio spectra with peaks in the GHz range. The spectral modeling of broadband radio spectra shows that a convex spectrum shape can be determined by synchrotron self absorption (SSA) processes with a contribution of the inhomogeneous free-free absorption (FFA) effects in some sources. The FR0s variability doesn't exceed 20 % mostly, although there are sources with variability up 40 %. We discuss different reasons for observed FR0s variability. The analysis of the light curves at 5, 8 and 11 GHz allows us to determine characteristic time scales 100-900 days and to get constraints of emitting regions sizes about 0.1-0.7 pc.

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