

Frequency-dependent core shift in ultracompact quasars

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We present results of a pilot project to measure apparent frequency-dependent core shift effect in ultracompact quasars by the phase referencing method. EVN observations including the Quasar network at 1.7, 2.3, 5.0, 8.4 GHz were successfully carried out in October 2008 covering 24 active galactic nuclei. Maps of intensity distribution were reconstructed at all four frequencies. A new method has been developed for measuring the shift based on observations of close triplets of radio sources by means of relative astrometry. We demonstrate that this method is capable to reach the stated goal for ultracompact sources. A more traditional method of self-referencing to optically thin jets is not applicable for them. High sensitivity and high quality of UV-coverage is crucial for achieving required accuracy of the measurements. Significant shifts are found in 9 out of 24 targets. Mean values of the core shift for frequencies 1.7, 2.3, and 5.0 GHz relative to the highest frequency of 8.4 GHz are 1.8, 1.2, and 0.2 mas, respectively. The distance between apparent core position at 8.4 GHz and the jet origin as well as magnetic field strength at the 1-pc distance from the true jet origin are estimated for a subset of targets. Typical values appear to be 2 pc and 1.2 G, respectively.