

A Survey of Active Galactic Nuclei Jets with the RadioAstron Space VLBI Mission

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Launched in 2011, the Russian RadioAstron orbiting radio telescope gives the highest angular resolution ever attained in astronomy. By observing in concert with large Earth-based telescopes, it has successfully achieved a record angular resolution of 30 microarcseconds, and is currently being used to survey a large set of radio jets associated with active galactic nuclei (AGN) at 1.3, 6, and 18 cm wavelengths. A major goal of its AGN key science program is to directly measure the sizes of the synchrotron emission regions in AGN jets, near the central black holes where they are formed. Earth-based VLBI has not yet been able to probe this regime. RadioAstron is thus providing new important details on the geometry, emission mechanisms, and amount of relativistic beaming in these powerful outflows. We present preliminary results from the RadioAstron AGN survey, demonstrating that very high flow Lorentz factors (> 100) or coherent emission mechanisms may be needed to explain the extreme compactness of the radio emission. We also compare our findings to those from the ground-based MOJAVE VLBA survey, which has found Lorentz factors ranging up to only ~ 40 in a large sample of the brightest known AGN jets.

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