

New look at old friends: EVN imaging of prominent radio-loud active galactic nuclei with extremely large radio-optical positional offsets

Content

When comparing modern fundamental reference frames in the radio (ICRF) and optical (*Gaia*), a couple of bright radio reference sources appear to have very large radio-optical offsets, from tens up to hundreds of milliarcseconds. The amount of these positional misalignments exceeds the uncertainty of each individual technique by at least an order of magnitude. In most cases, complex and extended radio structure and its time variability, and thus the difficulty in pinpointing the true location of the central engine, is responsible for the large apparent offsets. Sometimes distant parts of the radio structure are not properly detected due to a lack of shorter interferometer baselines. For our 5-GHz EVN and e-MERLIN experiment, we selected 10 bright radio-loud active galactic nuclei with extremely large radio-optical offsets. Sensitive imaging involving a wide range of projected baseline lengths, as well as phase-referencing to nearby sources shed light on the possible causes of positional inconsistencies. Here we present the first results of this project.

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