Three little radio galaxies in the early Universe


There are indications that the number of known radio-loud quasars above redshift z=4 is much smaller than expected from the number of sources with relativistically beamed jets (i.e. blazars). To explain the apparent deficit in the misaligned (non-beamed) population of high-redshift jetted active galactic nuclei, various explanations are proposed. These involve heavy optical obscuration and significantly different bulk Lorentz factors in jets at early cosmological epochs. It is also possible that the number of blazars is smaller than we think. Our recent European VLBI Network (EVN) observations targeting z>4 blazar candidates revealed that as many as 3 sources do not show high brightness temperature radio emission characteristic to relativistic beaming in jets, but rather kpc-scale double structures. These intriguing objects have significant radio emission resolved out with the EVN, while they are compact on ~5-10 arcsec scale. New dual-frequency e-MERLIN observations of these three sources revealed a rich morphology, bending jets and hot spots with possible sites of interaction between the jets and the surrounding medium at sub-arcsecond angular scales.