

Does Cygnus A harbor a binary black hole?

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Recently a new radio source was detected with the VLA in Cygnus A at a distance of about 460 parsec from the center. The source is not directly associated with the VLBI core and the jets, but coincides with a compact optical/near-IR source.

We detected the new source on sub-parsec scales with EVN observations at 1.3cm in March 2017 and 6cm and 18cm in May/June 2017. It appears compact and more luminous than any known radio super nova. The most plausible origin of the emission is a recent onset of activity from a so far not detected secondary super-massive black hole (SMBH). It could be an extreme type of a super-nova, but the enormous luminosity and compactness on sub-parsec scales and the flat spectral index suggest that a secondary SMBH may exist in the immediate surroundings of the central engine in Cygnus A.

Here we present our EVN observations and discuss their implications. Secondary SMBH are expected to be ubiquitous in galaxies, but they remain difficult to detect, with only a few celebrated cases known so far. The discovery that this archetypical powerful FR II radio galaxy may be a binary SMBH could mean that SMBH binaries may be more common, and more important, than previously considered.