

The Supermassive Black Hole Binary Candidate 3C 66A

The blazar 3C 66A is known for its optical flux periodicity and complex jet kinematics. Using 22/43 GHz KaVa (KVN and VERA array) observations and 43 GHz VLBA (Very Long Baseline Array) archival data, we have found that its pc-scale jet has a twisted structure and that the inner jet undergoes periodic swings every 13 years. In this talk, we will describe the peculiar characteristics of 3C 66A and delve into possible interpretation scenarios. The multiwavelength flux variability and jet orientation changes hint at a supermassive black hole binary (SMBHB) in which orbital motion and disk-orbit misalignment lead to jet precession. However, combinations of other mechanisms such as Lense-Thirring disk precession and jet instabilities could also account for the properties of 3C 66A, underscoring the challenge of robust SMBHB candidate identification. We will discuss how mm-VLBI can help discriminate against SMBHBs in the future, in the case of 3C 66A as well as other reported candidates.

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