Accretion-ejection morphology of the microquasar SS433 resolved at sub-au scale by VLTI/GRAVITY

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Abstract

We present the first Optical observation at sub-milliarcsec (mas) scale of the famous microquasar SS 433 obtained with the GRAVITY instrument on the VLTI interferometer. This observation reveals the SS 433 inner regions with unprecedent details: The K-band continuum emitting region is dominated by a marginally resolved point source ($<$ 1 mas) embedded inside a diffuse background accounting for 10% of the total flux. The significant visibility drop across the jet lines present in the K-band spectrum, together with the small and nearly identical phases for all baselines, point toward a jet that is offset by less than 0.5 mas from the continuum source and resolved in the direction of propagation, with a typical size of 2 mas. Jet emission so close to the central binary system implies that line locking, if relevant to explain the amplitude and stability of the 0.26c jet velocity, operates on elements heavier than hydrogen. Concerning The Brγ line, it is better resolved than the continuum and the S-shape phase signal present across the line on all baselines suggests an East-West oriented geometry alike the jet direction and supporting a (polar) disk wind origin. This observation show the potentiality of Optical interferometry to help constraining the inner regions of sources like microquasars.

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