

Jets from massive protostars: clues on their role in the formation process from masers and high resolution radio / NIR imaging

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Disks and jets are believed to deeply influence the early evolution of low-mass stars, but their role in high-mass ($M > 7 M_{\text{sun}}$) star formation is still unclear. A close investigation of disk/jet systems in the high-mass regime can help establishing if high-mass stars emerge from a scaled-up version of the low-mass formation scenario. We selected a sample of 40 high-mass young stellar objects from the BeSSeL (Bar and Spiral Structure Legacy) survey, located at a distance $d < 4$ kpc, and conducted multi-epoch observations of water masers and multi-frequency radio continuum imaging with VLBI /JVLA at subarcsec resolution. In this way we have been able to investigate the initial 100 au of jets and winds accelerated by the driving source. Critical information on jet collimation and propagation, however, can only be obtained by linking the sub-arcsec structure to the outflowing gas pattern on scales of 10^2 - 10^5 au from the central star (up to 0.5-1 arcmin). To investigate this region, still heavily embedded, we carried out very deep sub-arcsecond imaging of a sub-sample of 6 targets in the H₂ emission at 2.12 microns, which is a tracer of jet shocks, with the LUCI NIR cameras mounted at the Large Binocular Telescope (LBT). Here we present the results of our multi-wavelength observations of these 6 sources in maser, radio, and H₂ emission. We detect H₂ signatures associated to all the targeted compact radio sources, elongated in the same direction than the innermost radio emission. Our study confirms the presence of collimated jets in the vicinity of newly formed high-mass stars, pointing to a formation mechanism similar to the one of low-mass stars.