

ALMA2019: Science Results and Cross-Facility Synergies



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Collimation of the relativistic jet in the quasar 3C273

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Contributed talk

Abstract:

“The relativistic jet launched from the supermassive black hole at the center of active galactic nucleus (AGN) is one of the persistent highest energetic phenomena in universe. A key question to understand the nature is how the collimation occurs, enabling the central black hole to release the accretion and/or rotational energies to a larger scale structure beyond the host galaxy. Recent radio observations suggest that the collimation of the jet occurs on a wide range of scales inside the Bondi radius for some nearby low-powered radio galaxies. However, little is known for other AGNs like quasars due to the lack of the angular resolution. In this talk, we present the first VLBI observation including ALMA of the archetypical quasar 3C 273 at 86 GHz. Our observations achieve the highest angular resolution of $\sim 70 \mu\text{as}$, resolving the most inner part of the jet ever on scales of $\sim 10,000$ Schwarzschild radii. Our results suggest that the jet parabolically collimates inside the Bondi radius and has a transition to the conical flow, similar to jets from LLAGNs. These indicate the universality of the collimation process for AGNs with various accretion rates from LLAGNs to active quasars.”

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Session Classification: Galaxies