Title

Detailed mechanism of star formation driven by magnetized jet from Galactic Center

Abstract

Feedback from the galaxy·s central activities such as active galactic nucleus (AGN) is postulated as a key mechanism for regulating star formation within galaxies. The positive side of this mechanism is known to be jet-driven gas compression and consequent star formation. Studying the jet-driven star formation is thus crucial for understanding the coevolution of galaxies and supermassive black holes. However, due to the lack of angular resolution even with ALMA, the detailed mechanism of dense gas formation by the jet-driven compression is still unclear. We uniquely approach the problem by focusing on the closest galactic nucleus, the center of the Milky Way. The Double Helix Nebula (DHN), thought to be a magnetized jet from the central engine, is the only relic of past activity of the Galactic Center. We found that ten or more dense molecular clumps possibly including proto-stellar activities and diffuse HI gas are interacting with the DHN.
Through spatial and velocity analyses of the proposed high-resolution HI observations, we will offer crucial evidence for the formation mechanism of the star forming dense clump triggered by the jet compression.
Only MeerKAT can undertake this unique study, as the observations require high resolution and large FoV at the same time.
This study, and subsequent numerical simulations by our group, will help solve the recent great puzzle of star formation and galaxy evolution, and hence coevolution of the central black hole.