Resolving jet-driven AGN feedback in Centaurus A's northern filaments on a cloud-scale with ALMA

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Abstract

Active Galactic Nuclei (AGN) and their associated feedback mechanisms are pivotal in shaping galaxies. Especially the specific impacts of mechanical feedback via AGN jets are less well understood. Centaurus A, the nearest radio galaxy, presents a unique case to explore the dissipation of mechanical jet feedback at the scale of resolved molecular clouds in its northern filaments. To enable a comparative analysis, we apply the open-source segmentation algorithm pycprops to ALMA CO(1-0) observations in the northern filaments and modify it to account for the specific resolution and lower signal-to-noise constraints of our data. Novel observations with short and zero spacings from ACA and TP antennas extend a previous analysis of Salomé et al. 2017, additionally capturing more diffuse emissions.

I will report on the obtained cloud properties, such as mass, size, velocity dispersion and virial parameters. Our initial findings indicate significant deviations in the physical properties of the molecular clouds when compared to typical star-forming galaxies from PHANGS-ALMA. The implications on derived star formation efficiencies and the nature of the jet-driven AGN feedback in Centaurus A will be discussed. The new short spacing observations will also allow us to place limits on the diffuse molecular gas content in the northern filaments. This will provide new insights into jet-driven AGN feedback and the dissipation of mechanical energy.