



Contribution ID : 76

Type : **Poster**

Closing the AGN Feedback Loop Through Sub-kiloparsec Scale Gas Kinematics With JWST

Wednesday, 28 October 2026 14:15 (1)

Understanding how supermassive black holes influence the galaxies they inhabit remains a central challenge in astrophysics. The most massive galaxies in the Universe—Brightest Cluster Galaxies at the centers of galaxy clusters—offer an exceptional laboratory to study this connection. Immersed in vast reservoirs of hot gas, their central black holes both accrete surrounding material and release enormous amounts of energy, profoundly shaping the galaxy and its environment. The nearby Centaurus cluster, whose central galaxy is NGC 4696, provides a unique opportunity to observe this interplay in action thanks to its proximity and its spectacular network of cold gas filaments.

In this talk, I will present new JWST/NIRSpec IFU observations that, for the first time, allow us to follow the entire feedback cycle linking black holes and galaxies—from gas cooling and condensation to accretion onto the black hole—across scales ranging from kpc down to pc. These observations reveal a rotating circumnuclear disk in NGC 4696 that is directly connected to the surrounding cold filament network. This structure provides the long-sought missing link that channels gas from kpc scales down to ~100 pc and ultimately into the central black hole, effectively closing the feedback loop. Comparisons with stellar kinematics further show that gas and stars respond very differently to the central gravitational potential and to feedback processes.

These results provide new insight into how supermassive black holes shape their host galaxies and illustrate the transformative power of JWST for resolving the physical processes driving galaxy evolution.

Did you give a contributed talk at CASCA 2026?

Yes

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

MSc

Which keyword describes the area of focus of this talk?

Black holes

Primary author(s) : MARQUIS, Mathieu (Université de Montréal)

Co-author(s) : Prof. HLAVACEK-LARRONDO, Julie (Université de Montréal); Mrs PEREIRA, Olivia (Université de Montréal); Mr REEFE, Michael (MIT); Dr CHOI, Joseph (University of Michigan)

Presenter(s) : MARQUIS, Mathieu (Université de Montréal)

Session Classification : Black holes & Instrumentation