

## ALMA2019: Science Results and Cross-Facility Synergies



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# Cold gas regulating the life-cycle of radio AGN

*Tuesday, October 15, 2019 4:10 PM (15 minutes)*

Contributed talk

Abstract:

“ALMA observations provide a unique opportunity to study at high resolution the tight interplay between the interstellar medium (ISM) of a galaxy and the nuclear activity that may be triggered at its centre. In particular, ALMA observations of the cold molecular gas in a handful of nearby active galactic nuclei (AGN) have provided new insights on the physical mechanisms that regulate the growth of the central super-massive black hole (SMBH) of a galaxy (i.e. AGN fuelling), and on the effects of AGN on the evolution of their host (i.e. AGN feedback). In this talk, I will focus on the tight interplay between the life-cycle of radio AGN and the cold neutral and molecular gas located in the innermost kilo-parsec of two nearby active nuclei, PKS 1718-649 and Fornax A. In PKS 1718-649, multi-wavelength observations of the neutral and molecular hydrogen gave indications that a population of cold gas clouds is involved in the triggering and fuelling of the central active nucleus. ALMA CO (2-1) observations revealed that molecular gas is currently falling onto the SMBH within the innermost 75 pc, likely fuelling the recently started radio nuclear activity ( $t(\text{AGN}) \sim 10^2$  years). In Fornax A, broad-band continuum observations (between 84 MHz and 217 GHz), in conjunction with ALMA-ACA observations of the innermost radio emission, have been critical to unlock the history of nuclear activity. MeerKAT observations of the neutral hydrogen and ALMA-ACA observations of the molecular counterpart allowed us to study the physical conditions of the cold gas in the centre of this early-type galaxy, where successive minor mergers likely triggered multiple episodes of nuclear activity.”

**Presenter:** Dr MACCAGNI, Filippo

**Session Classification:** Galaxies