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AGN feedback in a nutshell: the multi-phase, sub-pc to galaxy-scale outflows in PDS 456, the most luminous quasar in the local Universe

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PDS 456 is a nearby, radio-quiet, type 1 QSO with a $L_{\rm BOL} \sim 10^{47}$ erg/s and can be regarded as the local counterpart of QSOs shining at z ∼2-3. It exhibits the prototype of massive and persistent X-ray ultra-fast (∼0.25c) outflow with a kinetic power of $0.2L_{\rm BOL}$(i.e., enough to significantly influence the evolution of the host galaxy). Our high-resolution ALMA mapping of the molecular gas discovered an extended (∼6 kpc) AGN-driven outflow being able to remove large amounts of gas from the galaxy center and provide efficient feedback. We will also focus on the NFM+WFM MUSE view of the properties of the ionized gas in PDS 456 reaching an unprecedented spatial resolution of ∼300 pc. MUSE uncovers an ionized outflow spanning 20 kpc with NFM data revealing a striking similarity in morphology and kinematics between the ionized and molecular outflow within the inner 1-3 kpc. The momentum load of the multiphase, galaxy-wide outflow challenges the conventional energy-conserving expansion paradigm. MUSE also unveils a complex environment of PDS456 with a CGM up to ∼50 kpc and 8 companions within ∼10-40 kpc. Our results strongly suggest that mergers, powerful AGN activity, and feedback via AGN-driven winds will collectively contribute to shaping the host galaxy evolution of PDS 456, and likely, that of similar objects at the brightest end of the AGN luminosity function across all redshifts.

sessioni congresso

Galassie e Cosmologia

Primary author: PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF))

Presenter: PICONCELLI, Enrico (Istituto Nazionale di Astrofisica (INAF))

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