Contribution ID: **51** Type: **not specified**

Environmental Dependence of Self-Regulating Black-hole Feedback in Massive Galaxies

Wednesday 17 August 2022 12:15 (15 minutes)

The ability of AGN feedback to self-regulate in massive galaxies depends critically on environmental factors like the depth of the potential well and the pressure of the surrounding circumgalactic medium (CGM). I have carried out high resolution 3D hydrodynamic simulations exploring the dependence of AGN feedback in galaxies on those environmental factors with a range of halo masses. These simulations also include in situ star formation and stellar feedback along with feedback from massive galaxy's old stellar population. Our simulations show that this feedback mechanism is tightly self-regulating in a massive galaxy with a deep central potential and low CGM pressure, permitting only small amounts of multiphase gas to accumulate and allowing no star formation. In a similar mass galaxy with shallower central potential and greater CGM pressure, the feedback mechanism is more episodic, producing extended multiphase gas and allowing small rates of star formation. Another important question I will touch upon is "how does kinetic AGN feedback with a strong momentum flux interacts with the CGM?"Our analysis shows that large scale CGM circulation plays an important role in reconfiguring the galactic atmosphere and regulating the atmosphere's central entropy level. We find that most of the AGN's energy output goes into lifting of circumgalactic gas rather than heating of atmospheric gas within the galaxy, consequently reconfiguring the circumgalactic medium (CGM) during our simulations.

Author: PRASAD, Deovrat (Michigan State University)

Co-authors: Prof. OSHEA, Brian (Michigan State University); Prof. VOIT, Mark (Michigan State University)

Presenter: PRASAD, Deovrat (Michigan State University)

Session Classification: Wednesday morning: AGN feedback