Contribution ID: **29** Type: **Talk**

Photoevaporation of molecular clumps in quasar outflows

Thursday, 11 October 2018 12:00 (15 minutes)

Detection of CO, HCN and H₂O lines show that quasar outflows are in molecular form up to a radius of 1-10 kpc. To reach such distances, the molecular gas has to be structured in clumps, able to provide sufficient self-shielding against the strong quasar radiation field. I present numerical simulations for the structure of a molecular clumps exposed to a UV radiation field, featuring radiative transfer coupled with hydrodynamics and an accurate chemistry model, including formation and destruction of molecular hydrogen. Molecular clumps are shown to undergo a violent shock-contraction phase, followed by a stationary phase where the molecules are progressively dissociated and flow away from the edge of the clump. The results show photoevaporation timescales of 0.3 Myr for clumps with mass 10³ M_{sun}, compatible with the observed extension of quasar outflows, suggesting that photoevaporation is the main mechanism regulating the size of molecular outflows.

Affiliation

Scuola Normale Superiore

Primary author: DECATALDO, Davide (SNS)

Co-authors: FERRARA, Andrea; GALLERANI, Simona; VALLINI, Livia; PALLOTTINI, Andrea

Presenter: DECATALDO, Davide (SNS)

Session Classification: Outflows and Feedback processes