STELLAR FEEDBACK AND ITS EFFECTS ON THE ISM AND STAR FORMATION REGULATION

Eve OSTRIKER

(Princeton University, USA)

Thursday, July 22, 2021, 13:30–15:15 (CEST)

On both scales of individual star-forming clouds, and scales of the whole ISM, stellar feedback — primarily associated with high-mass stars — has profound effects on the state of the ISM. Feedback therefore controls the ability of gas to collapse and form further stars, so that star formation rates and efficiencies can be self-regulated. In this lecture, I will begin by reviewing the main feedback agents, and the mechanisms by which they interact with their surroundings. These feedback agents include photo ionizing (EUV) radiation, non-ionizing (FUV) radiation, dust-reprocessed radiation, stellar winds, and supernovae. Radiation and shocks can directly heat and ionize gas, and the pressure forces from radiation and ionized gas also dynamically affect neutral gas. I will present numerical simulations of both star-forming GMCs and the large-scale ISM evolving under the effects of radiation, wind, and supernova feedback. While it has long been appreciated that feedback is crucial, simulations make it possible to evaluate the relative importance of different feedback mechanisms, and to quantitatively test the self-regulation paradigm. While there remain many opportunities for further research, current theoretical and computational results show promising agreement with observations.