

Deovrat Prasad – Astronomy seminar 11/7/2018

Title: "The Feedback Loop: Controlling Cooling Flows in Galaxy Clusters"

Abstract: Galaxy clusters are the largest gravitationally bound objects known in the universe and home to hundreds of galaxies. The space between galaxies are filled with hot, diffused plasma called intra-cluster medium (ICM). More than a third of galaxy clusters have cooling time of the hot diffuse gas in the ICM in their core smaller than their lifetime. As a result, the hot gas in cluster core is expected to cool down catastrophically with total cold gas mass deposition in the core greater than $10^{12} M_{\odot}$ during their lifetime and a star formation rate of several $100 M_{\odot} \text{yr}^{-1}$. However, lack of observational support of these cooling flow signatures in clusters with short cooling time (cool core clusters) point to the presence of some heating mechanism to compensate the cooling losses and prevent the runaway cooling. Among many possible candidates, AGN jets associated with the supermassive black hole present in member central galaxy of the cluster has emerged as the principle heating source. In this talk, I will discuss the evolution of cool cluster cores heated by feedback-driven bipolar active galactic nuclei (AGN) jets.