Contribution ID: **45** Type: **not specified**

Turbulence in the Intra-cluster Medium

Tuesday 16 August 2022 09:25 (25 minutes)

The intra-cluster medium (ICM) in the centers of galaxy clusters is heavily influenced by the "feedback"from supermassive black holes (SMBHs) jets, which prevents a catastrophic cooling and suppresses star formation. However, exactly how jets influence the surrounding ICM is unclear. Due to the limited spatial and spectral resolutions of X-ray telescopes, it has been rather challenging to observe turbulence in the hot ICM driven by SMBHs. Recently, my group developed a new method to measure turbulence in the hot ICM using high-resolution optical data of the multiphase filaments that are ubiquitous in cluster centers. We study the kinematics of the filaments by measuring their velocity structure function (VSF) over a wide range of scales in the centers of nearby galaxy clusters. The motions of the filaments are turbulent in all clusters. There is a clear correlation between features of the VSFs and the activities of the SMBHs, suggesting that SMBHs are the main driver of turbulent gas motions in the centers of galaxy clusters. The slope of the VSF differs from the classical Kolmogorov expectation and varies from system to system. Several theoretical explanations have been proposed but further studies are needed from both the simulation side and the observational side.

Author: LI, Yuan (University of North Texas)

Presenter: LI, Yuan (University of North Texas)

Session Classification: Tuesday morning: Turbulence