

Irina Zhuravleva – Colloquium – April 18, 2024
University of Chicago

Title: Probing Multi-Scale Physics of Intracluster Medium with X-ray Observations

Abstract: By virtue of their large mass and deep gravitational potential well, galaxy clusters are filled with low-density and very hot gas that emits X-rays. Many astrophysical processes, including feedback from supermassive black holes, matter accretion and mergers, are imprinted on this intracluster gas. Besides, clusters are ideal for studying the physics of weakly collisional and magnetized plasma - a state of matter that is not fully understood. Understanding this complex mix of astrophysical and plasma processes is crucial for modeling the evolution of the most massive halos in the universe. The next fundamental frontier in the studies of galaxy clusters is measuring gas velocities and related microphysics. The recent launch of the XRISM X-ray observatory will allow direct velocity measurement in many galaxy clusters for the first time, effectively transforming our “static view” of galaxy clusters into a full dynamic picture. Combined with high-quality imaging data from Chandra, we can probe multi-scale physics within the ICM, including turbulent cascade and dissipation of motions, transport properties of the ICM and effects of magnetic fields. In my talk, I will focus on these questions, provide a quick update on the XRISM mission, and discuss an exciting future with a recently proposed LEM mission.