

Dynamics of galaxy clusters and expectations from Astro-H

Galaxy clusters span a range of dynamical states, from violent mergers -- the most energetic events in the Universe -- to systems near hydrostatic equilibrium that allow us to map their dark matter distribution using X-ray observations of the intracluster gas.

Accurate knowledge of the cluster physics, and in particular, the physics of the hot intracluster gas, is required to realize the full potential of clusters as cosmological probes. So far, we have been studying the cluster dynamics indirectly, deducing merger geometries, cluster masses, etc., using X-ray brightness and gas temperature mapping. For the first time, the calorimeter onboard Astro-H will provide direct measurements of line-of-sight velocities and turbulent broadening in the intracluster gas, testing many of our key assumptions about clusters. This talk will summarize expectations for cluster dynamic studies with this new instrument.