

Chandra Cycle 18
MISSING BARYONS AND THE WARM-HOT CIRCUMGALACTIC MEDIUM
OF AN EDGE-ON SPIRAL GALAXY
Project Summary

Total: \$42,950

Project Period: 01/01/17 to 12/31/2018

PI: Anjali Gupta, Instructor, Biological & Physical Sciences



Columbus State Community College will work in collaboration with The Ohio State University, University of Miami and Instituto de Astronom in Mexico to review images taken from the Chandra x-ray observatory located in Cambridge, Massachusetts. Given the large amount of data involved in this project, we request a two-year funding. In the first year we will mostly focus on the reduction and analysis of the Suzaku data that we obtained and write resulting papers. We will also start reducing XMM-Newton data. The second year will be devoted to analysis, modeling, interpretations and writing of the resulting papers. Our team is experienced in analyzing the Suzaku and XMM-Newton diffuse mission data. The PI will be principally responsible for the completion of the project. We will have one undergraduate student per semester working on this project, paid through a one-time stipend. Dr. Gupta will guide the undergraduate student involved in this project, who will learn and perform the data reduction and analysis. The entire team will be involved in interpretation of results and help write papers for publication in astronomical journals.

Galaxy formation simulations predict that a large fraction of the baryonic mass of a spiral galaxy resides in the warm-hot circumgalactic medium (CGM). We have made deep Suzaku observations to probe the CGM of a nearby galaxy in emission. Unresolved point sources, mostly AGN, contaminate the weak emission from the diffuse plasma, so need to be removed. We propose to exploit the superb sensitivity of Chandra for detecting point sources to observe our three Suzaku fields. Helped by these short Chandra observations, we will detect and characterize the CGM of an external galaxy, determine its extent and density profile, and measure mass and baryon fraction.

Outcomes

We propose to exploit the vast archive of *XMM-Newton* data and the new *Suzaku* data we have obtained to study the circumgalactic medium (CGM) of Milky-Way-type spiral galaxies.

With the proposed program we will;

1. Detect and characterize the warm-hot Circumgalactic Medium in our targets.
2. Determine their extent and density profiles.
3. Measure their mass and baryon fraction.