



PHYSICS AND ASTRONOMY SEMINAR

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“The Galactic Ecosystem: Infall and Outflow in the Halo of the Milky Way”

Abstract

The ecosystem of galaxies is driven by the combination of outflows from the star-forming disk with infall due to interactions with nearby galaxies and the surrounding intergalactic medium. In the case of the Milky Way, the estimated star-forming rate has long been at odds with the detected accretable gas in the halo, raising the important question of where the Milky Way predominantly gets its gas. While ultraviolet absorption tracers suggest the presence of a widespread ionized component in the halo, both the neutral component and the resulting accretion rate have remained unclear. There are two critical steps in the process of solving this discrepancy: 1) differentiate between gas that is Galactic in origin versus that of extragalactic origin, and 2) determine the amount of neutral hydrogen in the halo. I present our work addressing both of these steps. Firstly we investigate whether the observed physical properties in neutral hydrogen of high velocity clouds reveals more about their origin or their environment. Our findings suggest that origin plays a key role in the observational signatures of halo gas. Secondly, we combine highly sensitive sightlines through the halo with the Galactic All Sky Survey catalogue of HVCs, finding evidence of two populations of gas: a dense bright narrow-line gas typical of high velocity clouds and a ubiquitous faint broad-line gas suggestive of a diffuse ambient medium surrounding clouds. Together these results allow us to construct a new picture of the Galactic ecosystem, where the measured star formation rate is in complete agreement with the combination of accretable material in the halo both neutral and ionized and where infall and outflows can be both distinguished and characterized based on their physical properties.

Wednesday, December 17, 2014

3:00 p.m.

Elliott Building

Room 162