Astrophysics Seminar

Discovery of Metal-poor and Metal-rich Gas around Low Redshift Galaxies

Tuesday

April 21

12:30 P.M.

Rm 184 NSH

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The circumgalactic medium (CGM) of galaxies is the interface between galaxies and the intergalactic medium (IGM). The flows of gas through the CGM - metal-rich outflows and metal-poor infall from the IGM - drive galaxy evolution. Probing the metallicity distribution of the cool CGM can shed light on the balance of infall onto and outflows from galaxies. I will show that the dense CGM has a bimodal metallicity distribution, with metal-poor and metal-rich branches peaking at about 3% and 40% solar metallicity. I will argue that the metal-poor branch likely traces the cold streams of infall that are predicted in cosmological simulations to feed galaxies with pristine gas. In equal numbers, we find the metal-rich branch, likely tracing outflows or tidally-stripped gas. I will also show that this characteristic distribution is not observed in stronger HI absorbers at similar redshifts, which are peaked around the higher-metallicity branch, showing a striking evolution of the metallicity distribution with HI column density.