Talk at Splinter Meeting

Splinter A

The Large-Scale Gaseous Environs of Quasars

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We study the gaseous environments of quasars on 20 kpc–500 kpc scales using several hundreds of projected (non-physical) quasar pairs. Specifically, we study the properties of of the foreground quasar halo by analyzing the rest-UV spectra of the background objects, and by focusing on MgII $\lambda\lambda 2796, 2803$ absorption lines as tracers of cool gas. We find that cool metal-rich gas is abundant in quasar halos within the central 100 kpc, with some dependence on the object luminosity, and that its kinematics is reminiscent of that seen in the halos of non-active galaxies. To shed light on the possible physical origin of the gas, we focus on the halo of a nearby Seyfert galaxy (NGC 1097) and study it using HST/COS. We are able to detect several kinematic components of hydrogen, silicon, and carbon absorption lines that are associated with the halo of the AGN. Using kinematic and photoionization modeling, as well as ample information in the literature on the properties of the host galaxy and its environs, we conclude that the cool gas is likely associated with a large-scale extended and rotating (geometrically-thick, quasi-) disk configuration. Further, the gas appears to be relatively metal-rich ($\lesssim 0.3\,Z_{\odot}$), and is most likely inflowing to the central object with a mass accretion rate that is comparable to the current star-formation rate in this system. Our findings are consistent with recent state-of-the-art simulations of galaxy formation and demonstrate the feasibility of absorption line studies to probe the interface between halos and galaxies over a wide redshift range with implications for the evolution of (active) galaxies and the intergalactic medium.