
Measuring magnetic fields in the circumgalactic medium of intervening galaxies

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Abstract

Dynamically important magnetic fields have been shown to play pivotal roles in processes that are intimately linked to galaxy evolution and IGM enrichment, such as disk-halo interaction, gas accretion and galactic-scale outflows in local galaxies. However, the role of this potential major player in galaxy formation and evolution at earlier cosmic epoch is poorly defined due to the lack of observations of magnetic fields in the interstellar and circumgalactic medium beyond the local universe. Faraday rotation (the line-of-sight integral of magnetic fields weighted by thermal electron density) of radio-bright and polarized quasar absorption line systems offers a unique and powerful way to probe the magnetic fields associated with infall and outflow of gas in intervening galaxies. In this talk, I will describe our current effort to detect magnetic fields associated with MgII absorber systems identified in the SDSS DR7 and DR12 quasar catalogs which also have corresponding Faraday rotation measurements in the largest rotation measure-redshift catalog of extragalactic radio sources to-date (Hammond et al. 2012). I will report the constraints we obtain on the magnetic fields in the circumgalactic medium of these intervening galaxies by comparing the probability distribution function of Faraday rotation toward sight lines with and without absorber galaxies. In addition, I will discuss systematic biases that one has to overcome in order to adequately interpret results from these statistical studies.

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