Measuring gas accretion on halo scales - A MEGAFLOW accretion study

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Abstract

In recent years a strong body of observational evidence has emerged suggesting that galaxies need to accrete gas from their surrounding medium. It is very much an ongoing challenge, though, to directly observe this gas accretion around individual galaxies.
Background quasars allow to probe the line-of-sight kinematics and physical properties of the gas surrounding intervening galaxies through the study of absorption lines. Combined with information about the galaxies' orientation and kinematics, the 3D kinematics both of the outflowing and inflowing gas can be constrained.

Unfortunately, background quasars are rare, and both identification of galaxy-absorber pairs and the subsequent measurement of the galaxy kinematics is an observationally expensive task, especially so at high redshifts. However, thanks to the MusE GAs FLOw and Wind [MEGAFLOW] survey, which is targeting 80+ galaxies associated to MgII systems at z=0.3-1.4 with the IFU spectrograph MUSE, we have a statistical sample of galaxy-absorber pairs to constrain the kinematics of the circumgalactic gas in an unprecedented way.
In this talk, I will focus on those galaxy-absorber pairs that we can identify as accretion cases. I will present the methodology and results with which we demonstrate the existence of predicted cold gas accretion-disks that are co-aligned and co-rotating with the associated galaxies. Further, I will demonstrate how we infer an approximate accretion rate.

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