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Presentation Requested: oral

Category: Environment, Large Scale Structure and Galaxy Evolution

Question: How has (or how will) ALMA (with other telescopes) help us better understand the impact of the environment on galaxy evolution? Can ALMA or one of the other new facilities detect the gas in the large scale structure, outside of galaxies? What can we learn from dwarf galaxies or galaxies in clusters and groups in the nearby Universe using ALMA + other facilities & how has this helped us understand galaxy evolution at higher redshifts?

Expanding the Low-Mass Galaxy Frontier with ALMA

While modern models of galaxy evolution have made significant strides in explaining the observed properties of massive galaxies over cosmic time, recent observational results have illustrated a fundamental problem with the ability of these same models to predict the evolution of low-mass systems. In particular, simulations of galaxy evolution tend to overpredict the number of passive (or "quenched") low-mass galaxies at low and intermediate redshift. Using data from the SDSS, I will present recent work to constrain the quenching of satellite galaxies in the local Universe, with a focus on identifying the host and satellite properties critical to the cessation of star formation at low stellar masses. This analysis, when combined with observations of the Local Group, points towards a characteristic mass scale for satellite quenching as well as strong limits to our understanding of dwarf galaxies. Finally, I will present the opportunities available with ALMA to expand our knowledge of this low-mass galaxy frontier, pushing to understand the dependence of the molecular gas depletion timescale and quenching timescale on stellar mass and environment.