New Insights Into the Formation of Massive Galaxies in the Early Universe

Commonly proposed mechanisms for quenching star formation in massive galaxies, such as major mergers and AGN feedback, typically result in bulge-dominated systems or galaxies with significant spheroid components. Semi-analytic models of galaxy formation that utilize these quenching mechanisms are highly successful in reproducing the observed bimodal distribution of galaxy colors and morphologies in the local Universe. However, recent studies of the distant Universe have revealed a population of massive disk galaxies at high-redshift that appear to be comprised entirely of old stars. These old, disk galaxies lie on the most massive end of the red sequence at the observed epoch, in stark contrast to the spheroid-dominated red sequence of today. The discovery of massive disks of old stars may provide evidence that additional processes are important in quenching star formation. I will discuss what constraints these and other observations of quenched galaxies at high-redshift place on galaxy formation scenarios and what we can discern about the growth and evolution of the most massive galaxies in the Universe.