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Category: Cosmic Star Formation History
Question: Other

The Star-Formation Histories of M Galaxies and Implications for ALMA

I will discuss the star-formation histories, evolution of stellar mass growth and structure assembly of the progenitors of M^* galaxies with present-day stellar masses of M^* galaxies - which include both Andromeda-like and Milky Way-like galaxies - from $0 < z < 3$. The star-formation histories have deep implications for the gas masses and gas accretion rates of M^* galaxies, making predictions for ALMA. The M^*-galaxy progenitor samples are selected from ZFOURGE, a deep medium-band near-IR imaging survey using Magellan/FOURSTAR, which overlaps with the HST CANDELS survey and includes deep imaging from Spitzer and Herschel, and is sensitive to masses and SFRs of the progenitors of Milky Way-sized galaxies out to $z \sim 3$. Using the rest-frame UV and IR data, the star-formation rates (SFRs) of the galaxies peaked at $1.8 < z < 2.5$ at $\Psi = 50\ M_\odot$ yr^{-1} for the M31 and from $1.5 < z < 2$ at $\Psi = 30\ M_\odot$ yr^{-1} for the MW, respectively. Furthermore, we find that the evolution of the specific SFRs are highly anticorrelated with the evolution in the bulge mass (derived from the HST data) apparently similar to predictions from "morphological quenching" models. In particular, the size and SFR evolution imply that the formation of galaxy bulges corresponds to a rapid decline in the galaxy gas fractions. I will discuss the predictions that this makes for the gas masses in the progenitors of MW and M31-like galaxies, which will be testable with ALMA.