Gas Inflow and Cosmic Star Formation Efficiency Beyond Z~3

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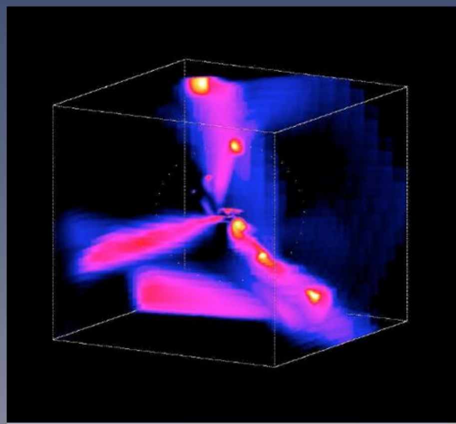
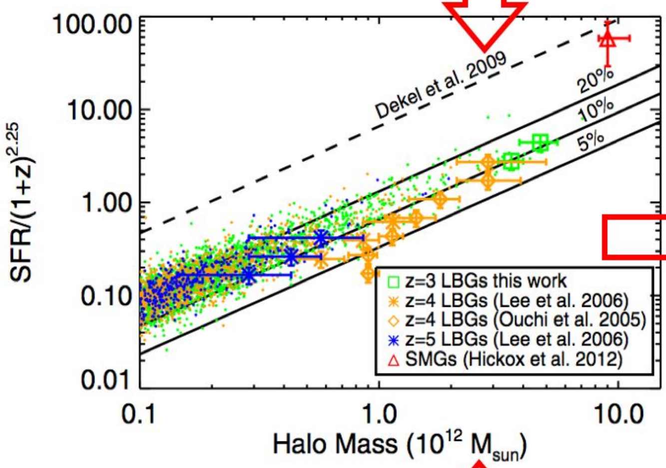
Baryonic gas accretion rate ($\dot{M}$) onto dark mater halos is a function of a function of redshift (z) and halo mass (M_{halo}) from cosmological simulation (Dekel et al. 2009)

$$\dot{M} = 6.6\left(\frac{M_{halo}}{10^{12} M_{sun}}\right)(1+z)^{2.25}\frac{f_b}{0.165}(M_{sun} yr^{-1})$$



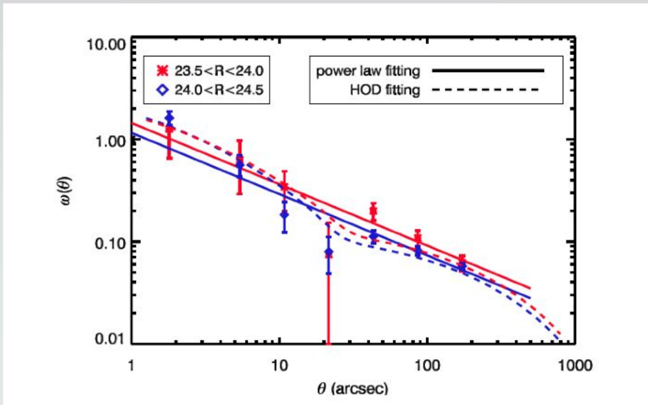


CONCLUSION

- **Tight relation between host halo mass and LBG SFR:**
  High-z LBGs are fueled by baryonic accretion through the cosmic web.
- **The cosmic star formation efficiency is 5% - 20%.**
- **This efficiency does not evolve significantly with redshift, halo mass, or galaxy luminosity.**

We build up a large sample of z~3 Lyman break galaxies (LBGs) in the NOAO deep and wide field with our new LBT U-band images. The large survey area (9 deg^2) allows us to estimate the host halo mass for two samples of bright LBGs by fitting the spatial correlation function with halo occupation distribution (HOD) models. By combining our measurements with the LBGs at higher redshift and lower luminosity, we show the redshift scaled star formation rate (SFR) as a function of hosting halo mass in z=3-5 LBGs and compare it with the prediction of the cosmological simulations in above plot.

Spatial angular correlation function of bright LBGs at z~3 and best fitted HOD models



See details in Bian et al. ApJ, 774, 28