

Witnessing galaxy assembly at the edge of the reionization epoch*

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- $z \sim 6$ でのCO輝線検出はほとんどない(明るいquasarのみ数天体)
- DLA
 - Luminosity でバイアスされない
 - $z < 4$ でCOや[CII]がALMAで受かり始めている
 - 対応天体を見つけるのは日所にchallenging

Serenity-18 : $z=5.939$ DLA host galaxy

- XSHOOTERでSDSSJ2310+1855($z=6.00$ quasar)のDLA同定
 - $z=5.939$
 - $\Delta v = 2746 \text{ km/s} \Rightarrow$ damping wing の形から $\log(N(\text{HI}))=21 [\text{cm}^2]$
 \Rightarrow self shielding が働く必要があるので, $n(\text{HI}) > 0.1/\text{cm}^3$
 \Rightarrow size $< 4 \text{ kpc}$: IGMからさいきんできた filament or clump ?
 - Metal Poor : $[\text{Fe}/\text{H}] = -3.08$, $[\text{Si}/\text{H}] = -2.86$
 - abundance patternはPopII SNeで説明可能
- 40kpcはなれたところALMA-CO(6-5)で検出
 - $M(\text{H}_2) = 5e9 M_{\text{sun}}$
 - $\Delta v = 2710 \text{ km/s}$
 - 空間分解できず。 $< 3.6 \text{ kpc}$
 - $M_{\text{dyn}} < 5.6e9 M_{\text{sun}}/\sin(i)^2$
 - $f_{\text{gas}} = 0.6-0.9$ くらいか
 - K-S lawをつかうと $\text{SFR} = 100 M_{\text{sun}}/\text{yr}$ と予想される (dust continuumの upper limitとconsistent)

シミュレーションでできた銀河(Atheaea)と性質がよくが合う

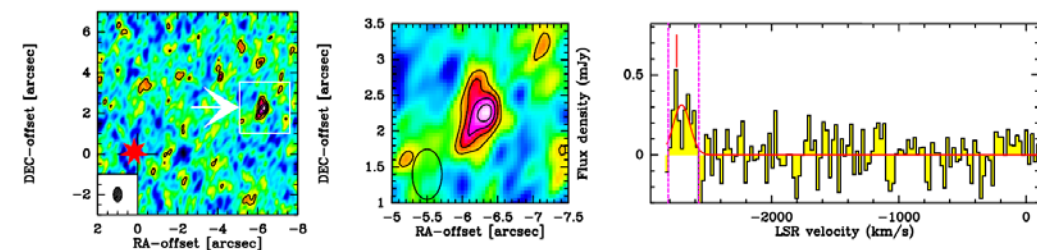


Figure 2. Left panel: the velocity integrated map of the CO(6-5) line of the DLA host galaxy (indicated by a white arrow),

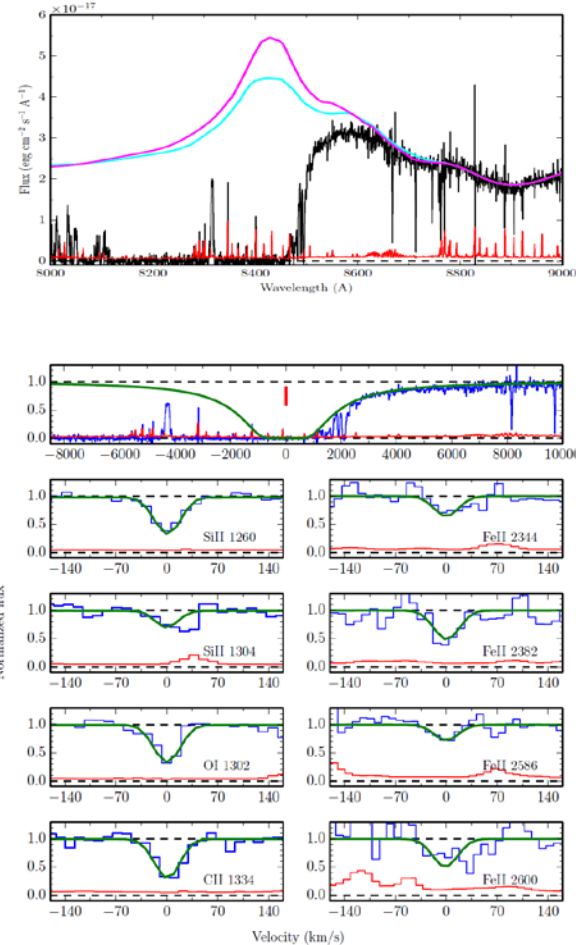


Figure 1. Upper panel: Flux calibrated spectrum of J2310 in the region of the Ly- α emission line

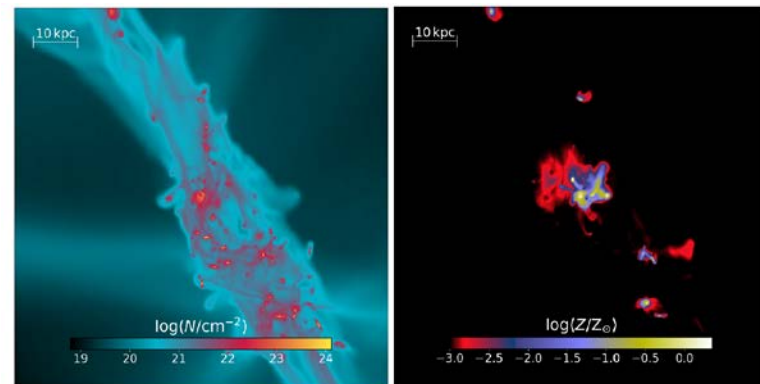


Figure 3. Maps of the H I column density (left panel) and metallicity (right panel) for the simulated galaxy Althea at $z \approx 6$.