

## 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 Pop II SNe で説明可能
- 40 kpc 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

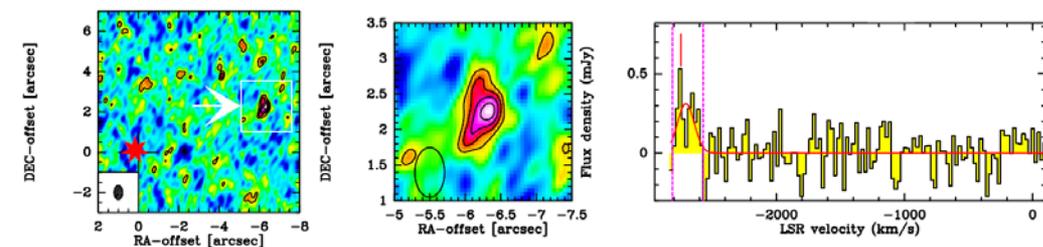


Figure 2. Left panel: the velocity integrated map of the CO(6-5) line of the DLA host galaxy (indicated by a white arrow),

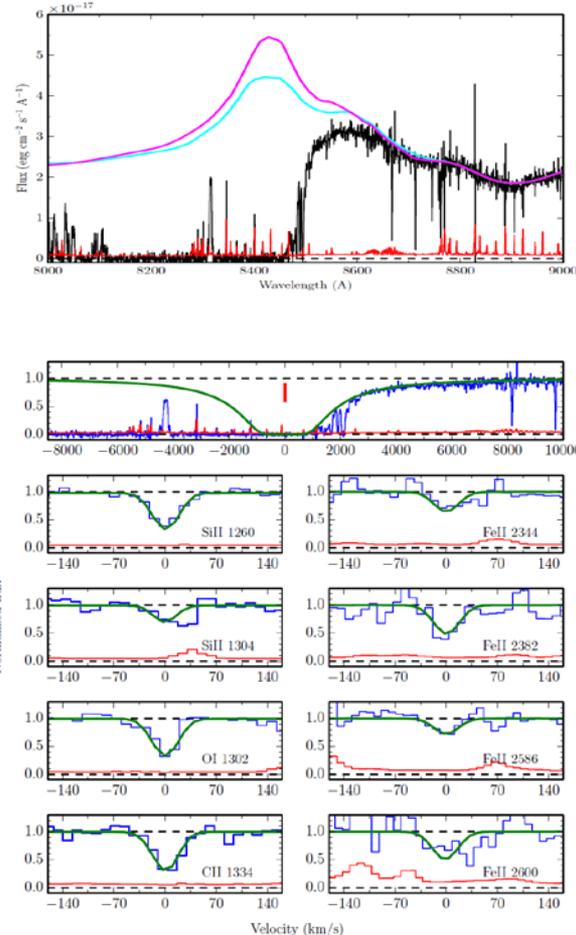


Figure 1. Upper panel: Flux calibrated spectrum of J2310 in the region of the Ly- $\alpha$  emission wi

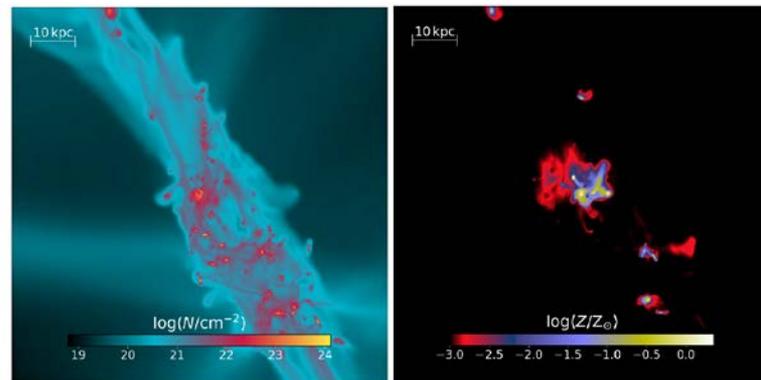


Figure 3. Maps of the H I column density (left panel) and metallicity (right panel) for the simulated galaxy Althea at  $z \approx 6$ .