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THE IONIZING PHOTON PRODUCTION EFFICIENCY (ξ_{ion}) OF LENSED DWARF GALAXIES AT $z \sim 2$*

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宇宙の再電離のソースは銀河なのかAGNなのか
⇒ IGMに放射される電離光子数の赤方偏移進化を調べる

$$\Gamma = \int L\Phi(L)\xi_{ion}(L)f_{esc}(L)dL \qquad (1)$$

Escape fraction (f_{esc}), Luminosity Function ($\Phi(L)$)は観測的に決まりつつある
⇒ ξ_{ion}(ionizing UV/non-ionizing UV)を決めたい。
方法1 : recombination ilne (Ha, Hb)
方法2 : metal line + stellar continuum + photoionization model

軽い銀河の寄与はモデルを絞り込む上で重要
そもそも軽い銀河の方がfescが大きいと予想されている

Z=1.4-2.7, M*=1e7.8-9.8Msunの重力レンズ銀河のξ_{ion}の評価
(z>6でのアナログとして)
データ: MOSFIRE Ha & 1500A UV
サンプル:62天体中28天体を解析に利用

$$\xi_{ion} = \frac{Q_{H^0}}{L_{UV}} \; [s^{-1}/erg.\ s^{-1}.\ Hz^{-1}] \qquad (3)$$

$$L_{H\alpha}[erg.\ s^{-1}] = 1.36 \times 10^{-12}\ Q_{H^0}[s^{-1}] \qquad (4)$$

わかったこと

- Effective ξ_{ion}(= $\log(\sum L_{H\alpha} / \sum L_{UV})$) の方がTypical にくらべて大きい:
  よりくらい銀河からの寄与が大きい
- 近傍の結果に比べてξ_{ion}は大きい:
  - Metallicity がより小さい
  - 直近の星形成より活発
  - 大質量バイナリが多い
- ξ_{ion}は他のhi-zの結果と同様の値
- ξ_{ion}にMUV, betaの依存性は見られない
- ξ_{ion}はEW(Ha), EW(OIII)と正の相関

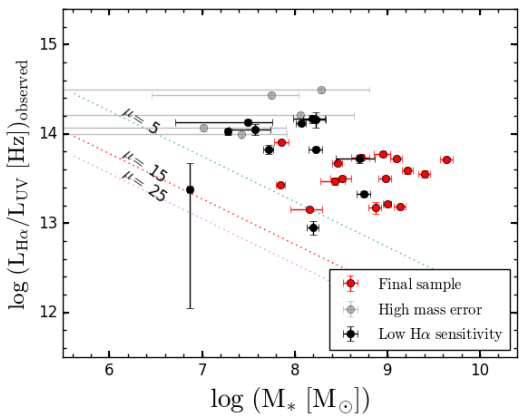

Figure 1. Not dust-corrected $\log(L_{H\alpha}/L_{UV})$ as a function of $\log(M_*)$ derived from the observed $L_{H\alpha}$ and L_{UV}.

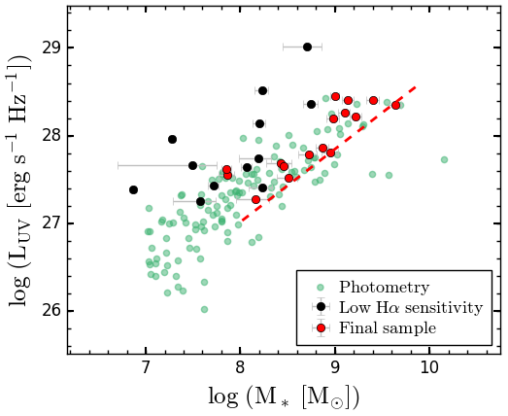

Figure 2. Log (L_{UV}) - log (M_*) relation of our lensed galaxies. Green points are the parent photometric sample with M_* above $10^7 M_\odot$. The final spectroscopic ξ_{ion} sample is shown

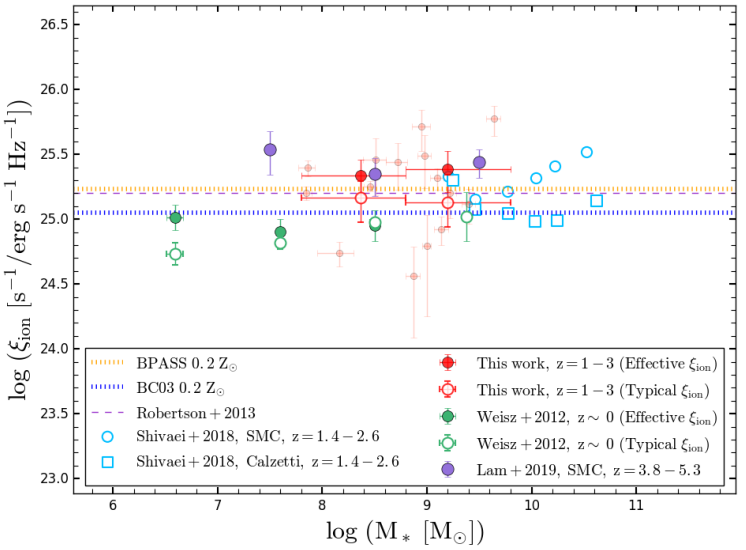

Figure 3. Log(ξ_{ion}) as a function of log(M_*). Log(ξ_{ion}) derived from the *Typical* ξ_{ion} stacking method are shown in red open

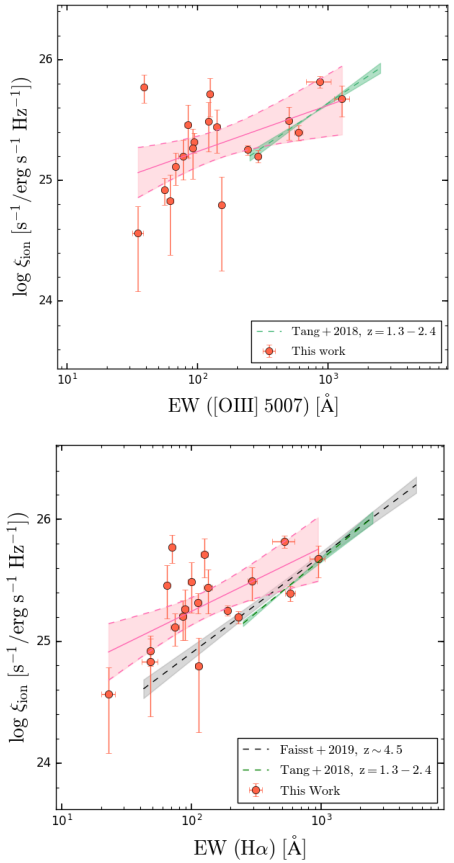

Figure 6. Top:log (ξ_{ion}) vs. [O III] 5007 equivalent width.