

EVIDENCE FOR A HARD IONIZING SPECTRUM FROM A Z=6.11 STELLAR POPULATION

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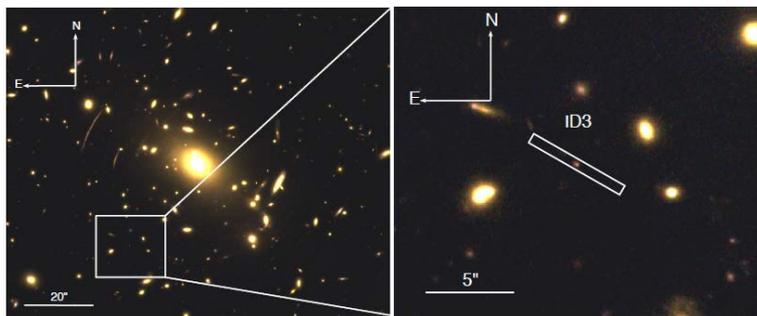
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ABSTRACT

- Z=6.11 Lensed LAE
- Magellan FIRE spectroscopy
- 強いCIV 1550, OIII]1666検出
- HeII 1640は受からず
- 2.5-3.5Ryd photonはあるが、>4Rydはない
- Low metallicity stellar populationとconsistent
- AGNでは説明しにくい

Z>6 galaxy NIR spectroscopy

- strong UV metal line (5-10x larger EW than z=2)
- FIR [CII], [OIII] detectionあり
- Z=7.045 CIV1550まで検出されている (47.9eV)
- CIVは local dwarf SFGでも検出されているので、おそらくlow metallicity によるhard radiation field
- これら性質はどれくらい一般的なのか？
- AGNでは説明できないのか？



Magellan / FIRE Obs.

- RXC J2248-ID3 (Z=6.11)
- 2.2-8.3x magnification
- MUV=-19.8 : sub-L* galaxy
- Mstar=1e8 Msol
- sSFR=50 /Gyr
- 0.6''slit, R=6000
- 9.2hr on source

	λ_{rest} (Å)	λ_{obs} (Å)	Line Flux ($10^{-18} \text{erg cm}^{-2} \text{s}^{-1}$)	W_0 (Å)
Magellan/FIRE				
Ly α	1215.67	8643.5	33.2 \pm 2.3	39.6 \pm 5.1
NV	1240	...	< 1.8	< 2.3
CIV	1548.19
...	1550.77	11023.8	5.7 \pm 0.9	9.9 \pm 2.3
He II	1640.52	...	< 1.5	< 2.8
OIII]	1660.81	11796.9	1.7 \pm 0.6	2.9 \pm 1.4
...	1666.15	11837.1	2.7 \pm 0.6	4.6 \pm 1.6
HST NIR WFC3 G102				
CIV	1549 ^a	...	14.0 \pm 3.8	24.5 \pm 7.1
CIII]	1908 ^b	...	< 3.6	< 7.9

^aTotal CIV $\lambda\lambda$ 1548,1550 flux, ^bTotal CIII] $\lambda\lambda$ 1907,1909 flux.

Table 1

Rest-UV emission line measurements of the z = 6.11 galaxy RXC J2248-ID3 from Magellan/FIRE and the HST WFC3/IR grism. Non-detections are listed as 2 σ upper limits.

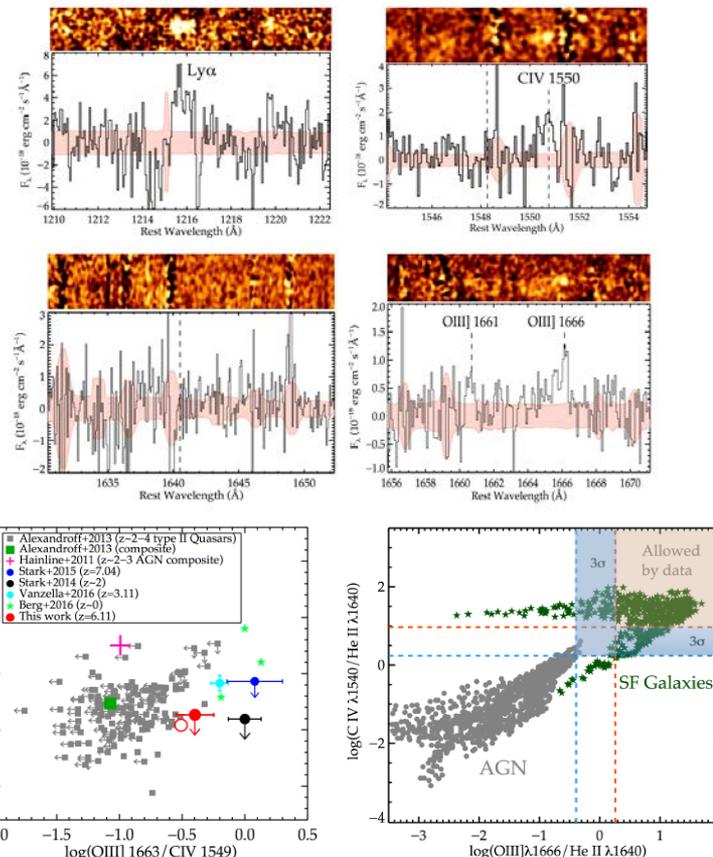


Figure 4. (Left:) Comparison of UV line ratios associated with metal poor CIV emitters and systems known to be narrow line AGN at z~2-4. The filled red circle shows the line ratios of RXC J2248-ID3 if we adopt the empirically-motivated line ratio in which CIV λ 1548/CIV λ 1550=1; the open red circle corresponds to an upper bound on the total CIV $\lambda\lambda$ 1548,1550 flux adopted using the WFC3/IR grism measurement. The metal poor star forming systems are mostly separated from the AGN / quasar samples, suggesting they are subject to a softer radiation field. (Right:) Comparison to photoionization models of Feltre et al. (2016). Grey (green) points correspond to flux ratios predicted from the AGN (stellar) photoionization models in Feltre et al. (2016). The red (blue) dashed line represents 1- σ (3- σ) limits on the line ratios, demonstrating that the data are better explained by a stellar radiation field.

- CIV and OIII] : 2.5-3.5Ryd photon必要
- HeII : 4Ryd photonが必要
- OIII] : 4Ryd photonでさらに電離され、強度は弱くなる
- ⇒ この天体は2.5-3.5Ryd photonはあるが、>4Ryd photonは少ない
- ⇒ AGNでは説明がつかない
- ⇒ 近傍とは異なったstellar continuumが必要
- ⇒ Reionizing eraでのionization productionをlower-zからの外装で考えるのは危険ではないか。

このあたりの輝線などを狙った、HFFなどのSWIMS-IFU blind surveyはやはり面白いかもしれない