

**Light & Shadow in the Deep:  
Strong Absorption Systems Probed by a Deep NB Imaging**

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**NAOJ Fellow (Subaru Telescope)**

## **2min-: Narrow-Band Absorbers (NBAs)**

- **What are NBAs?**
- **Dual NBA-H $\alpha$  Emitters at  $z=2.5$**
- **Puzzling NBAs behind the Narrow-band Redshift**

## **7min-: Diffuse H $\alpha$ Light outside of ISM of galaxies**

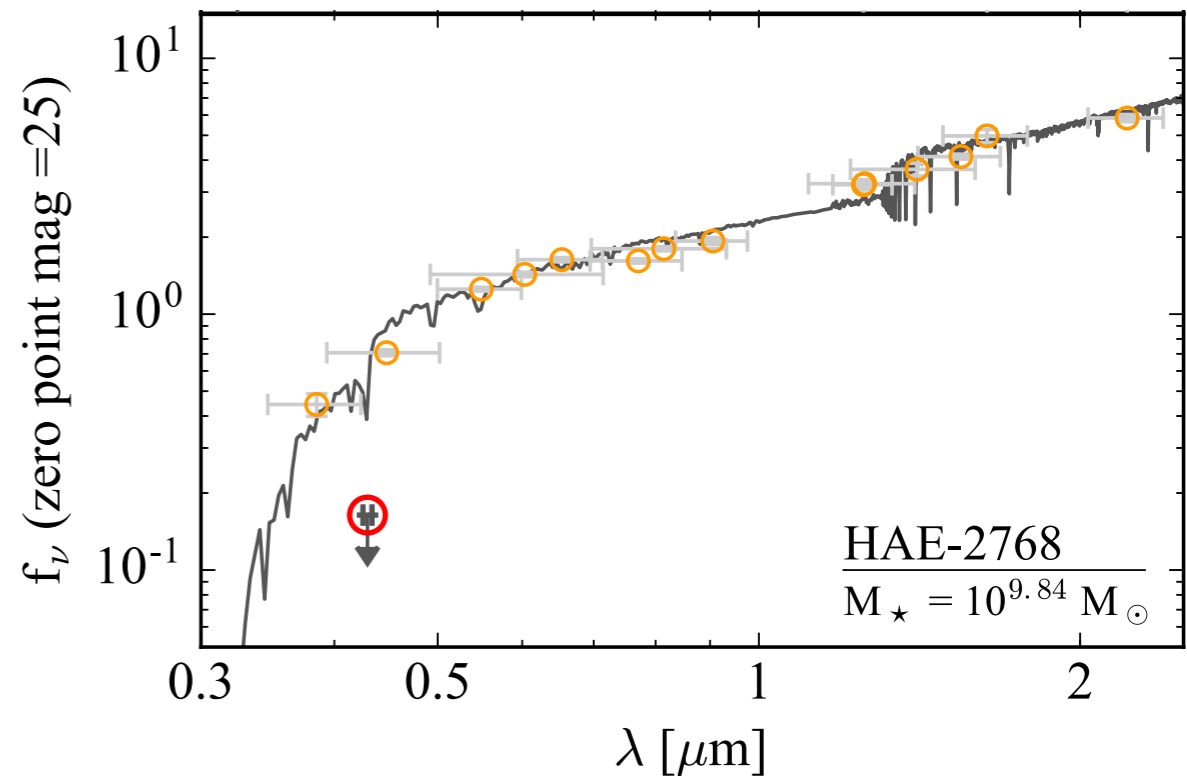
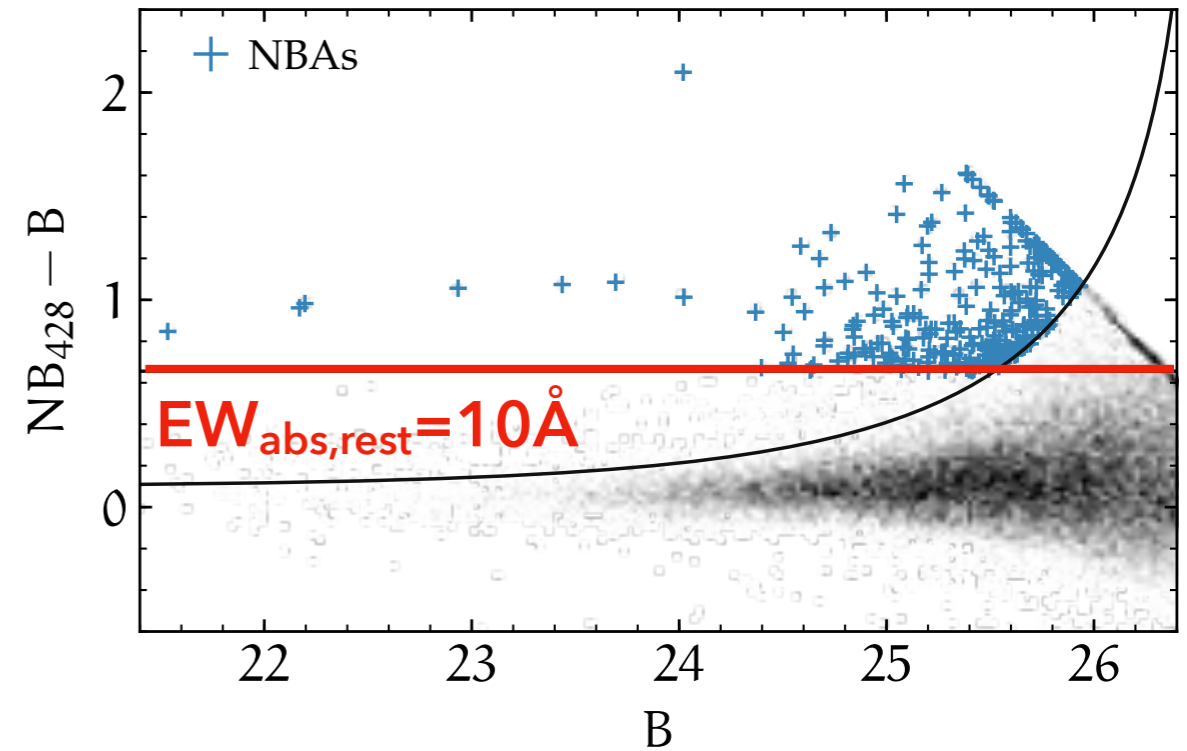
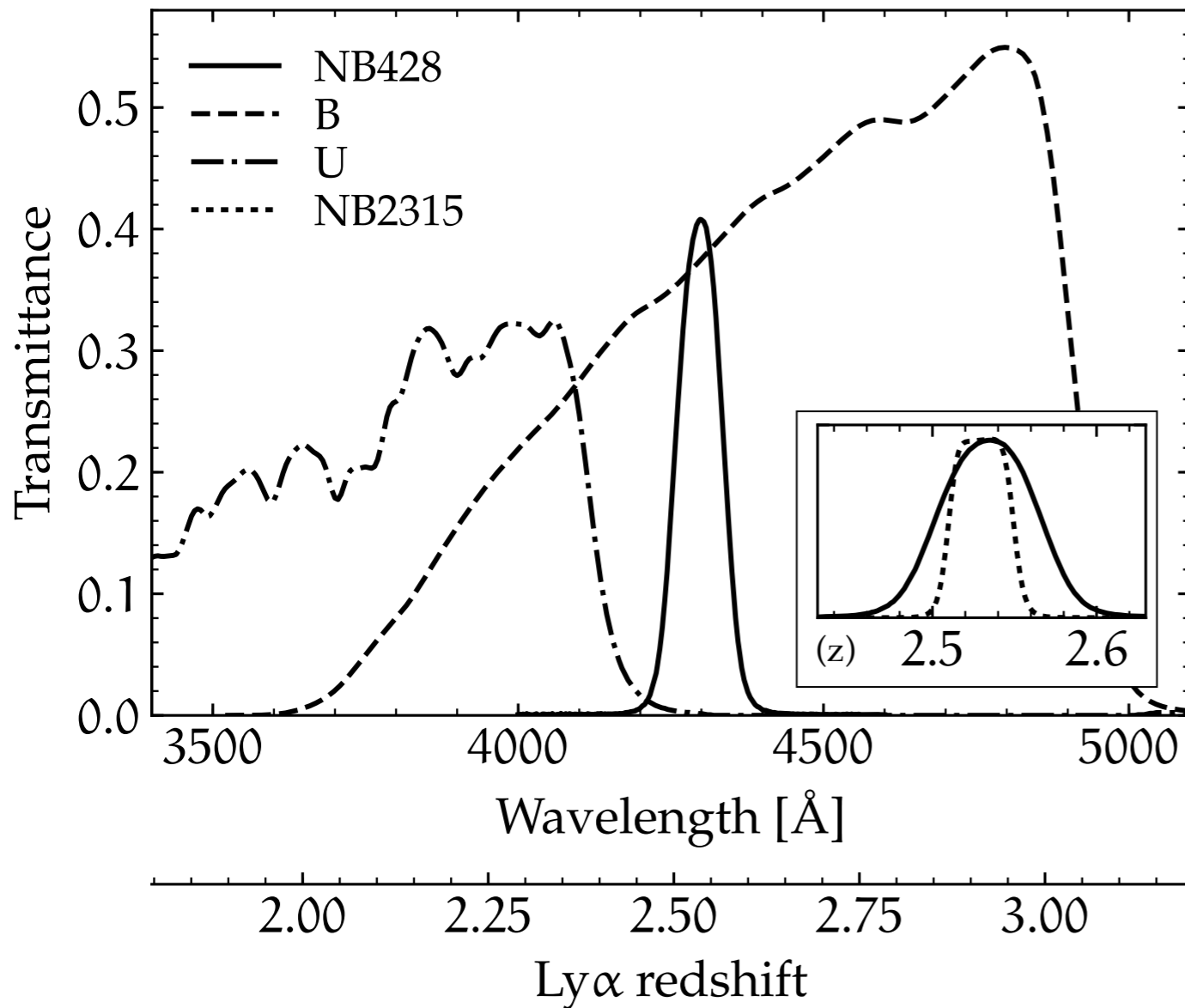
- **Narrow-band Emitters from HSC-SSP U/Deep Survey**
- **Deep Stacking of H $\alpha$  Emitters at  $z=0.4$**
- **Radial Profile of H $\alpha$  Line Emission**

## **10min-: (Announcement) Subaru 20th Anniversary**

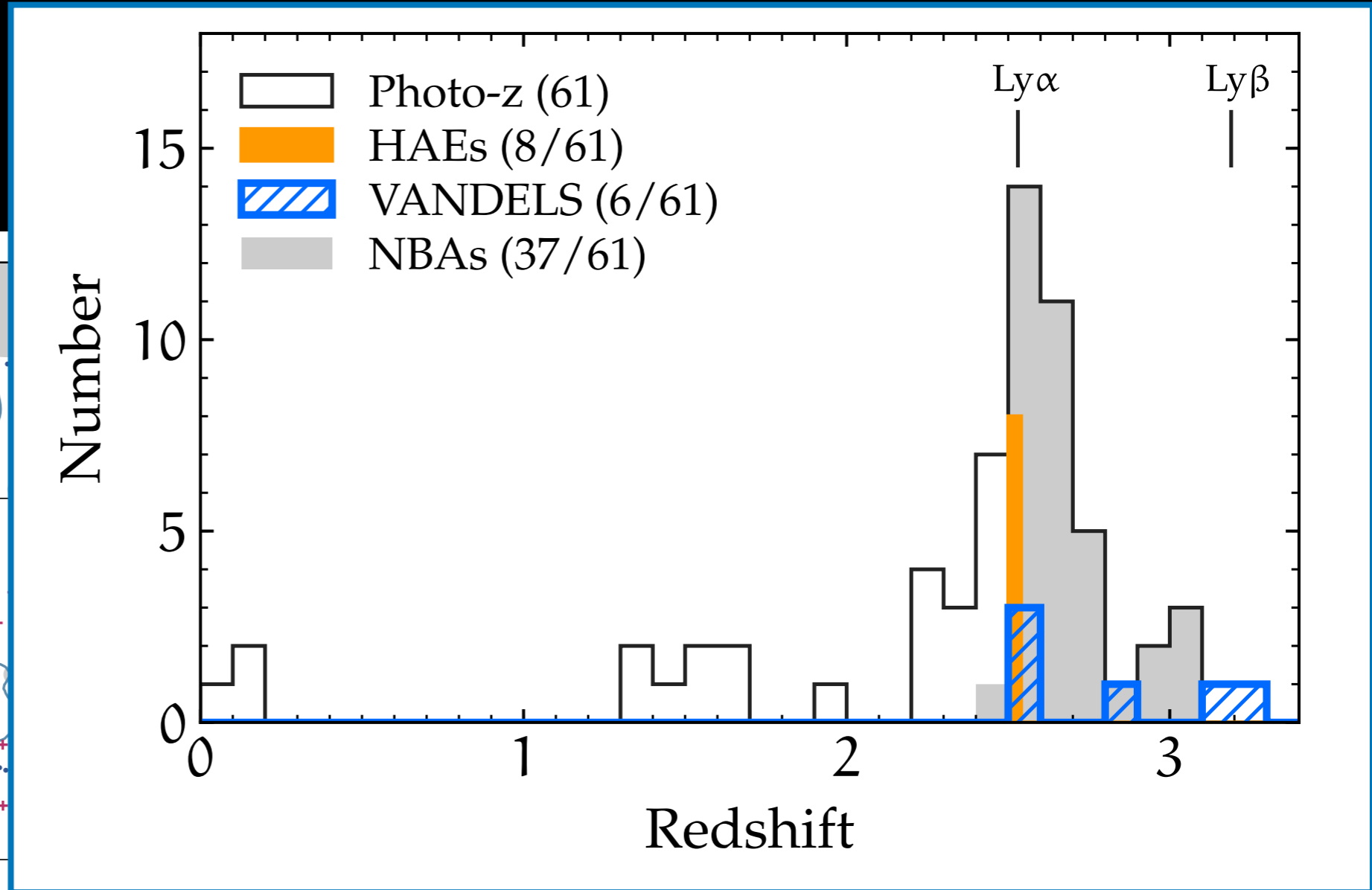
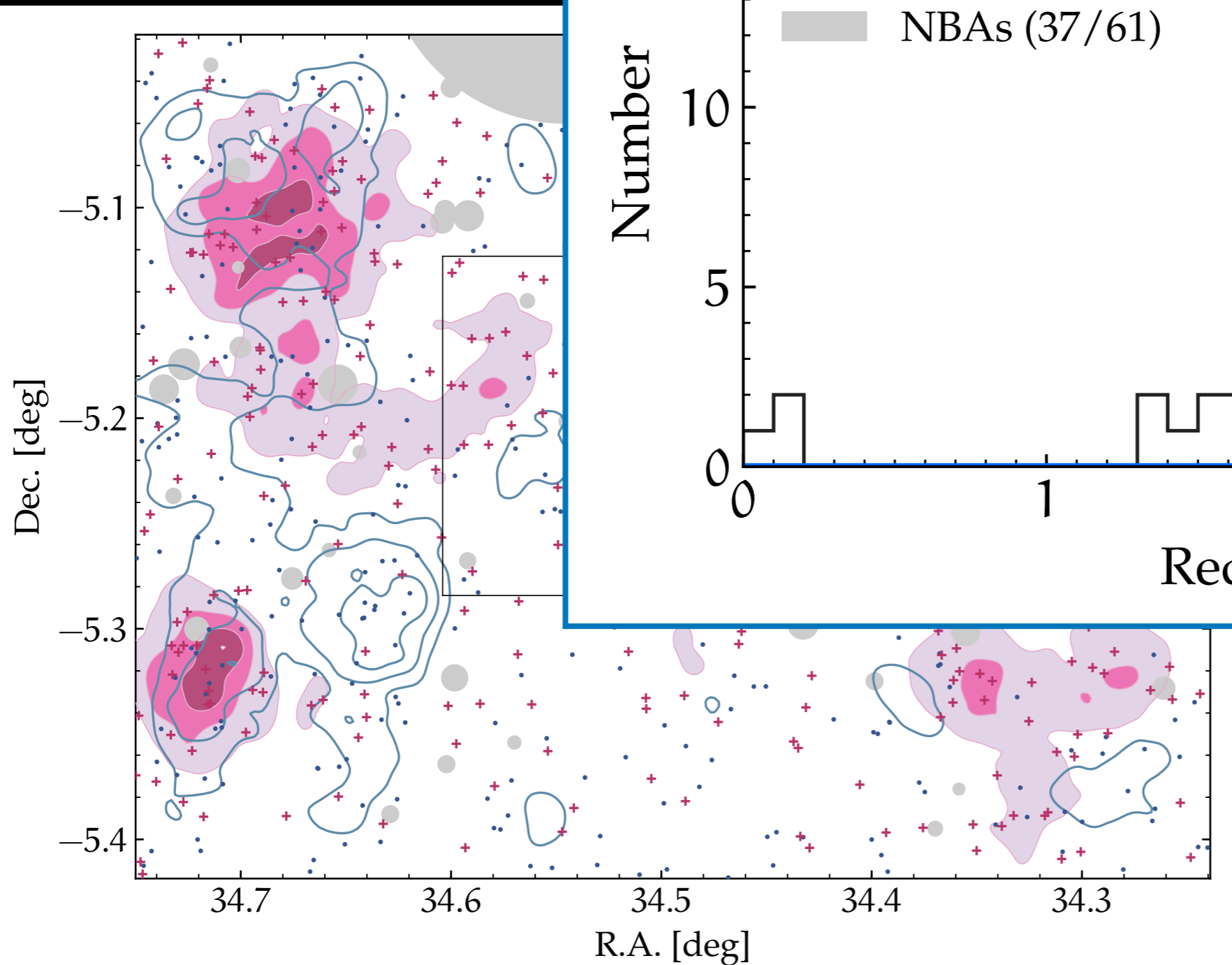
- **Towards Subaru International Operation**
- **Subaru-EAO HZG WS 2019**
- **NAOJ Symposium: Subaru 20th Anniversary & UM at Hawaii**

# Narrow-Band Absorbers (NBAs)

Sources showing NB 'deficits'  
we expect *Ly $\alpha$*  abs. in this case



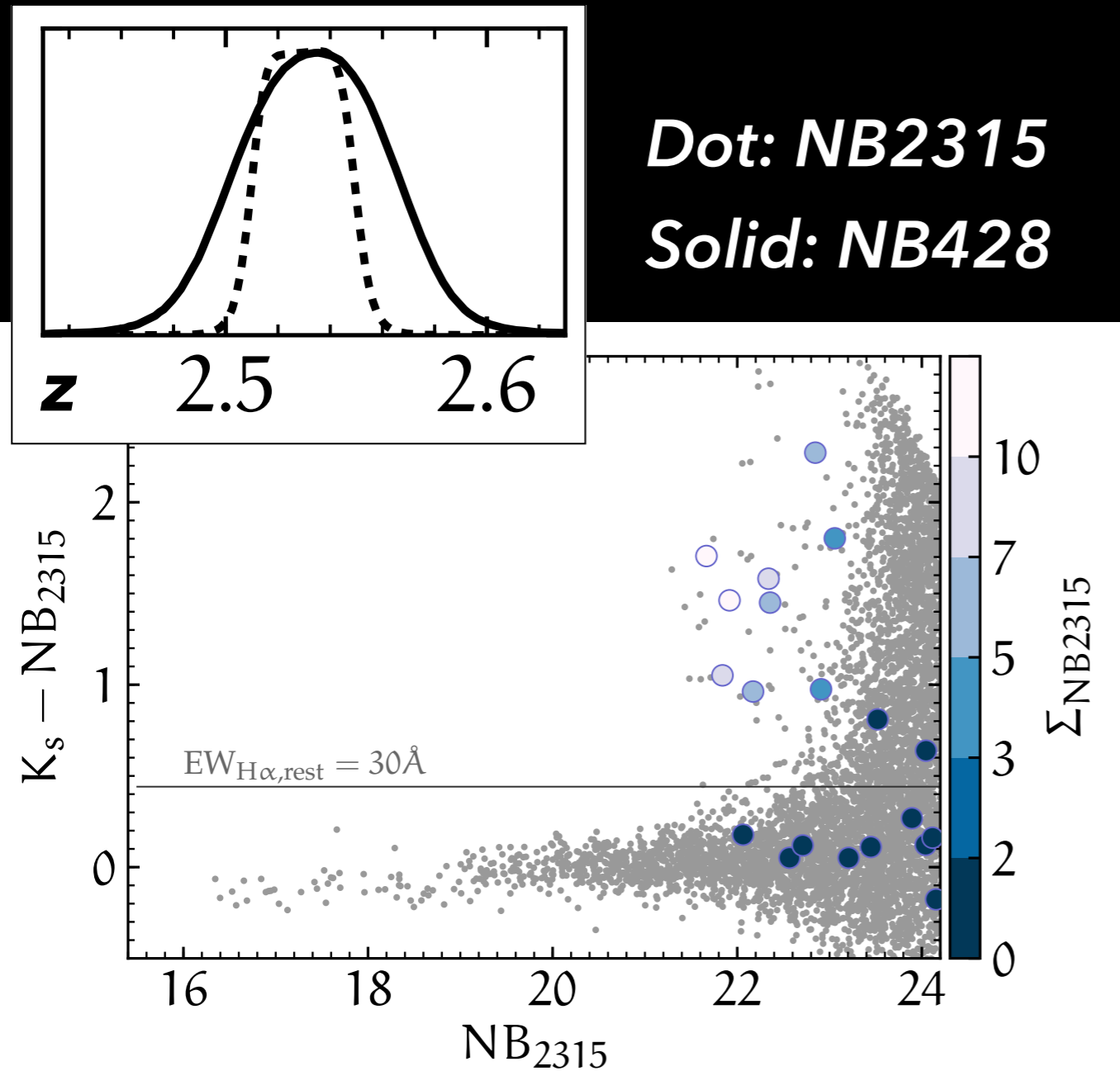
# Spatial and Redshift Distribution of NBAs



# Dual NBA-HAEs?

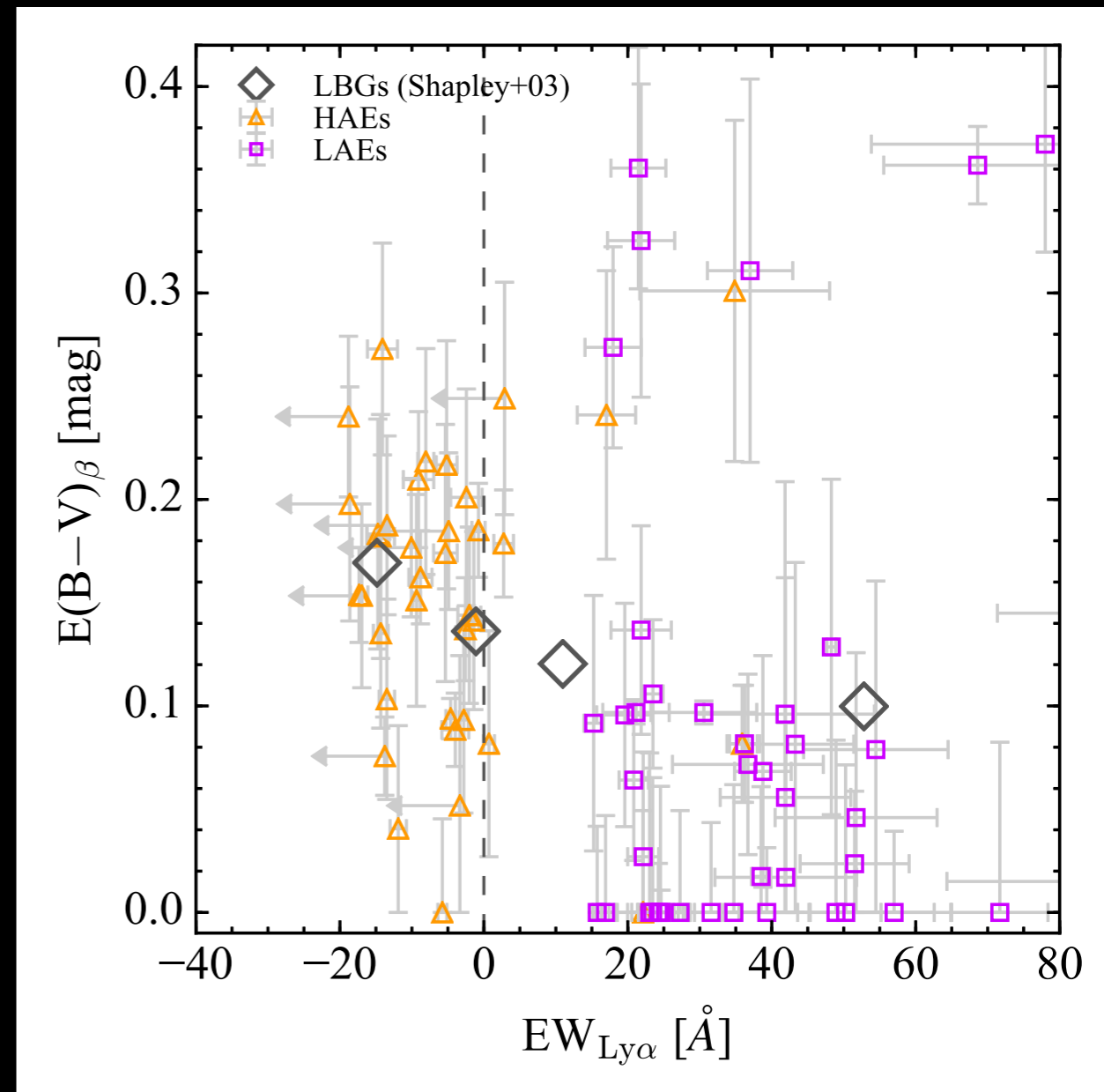
## Dual NBA-HAEs

$EW_{Ly\alpha} < -10\text{\AA}$  &  $EW_{H\alpha} > 100\text{\AA}$



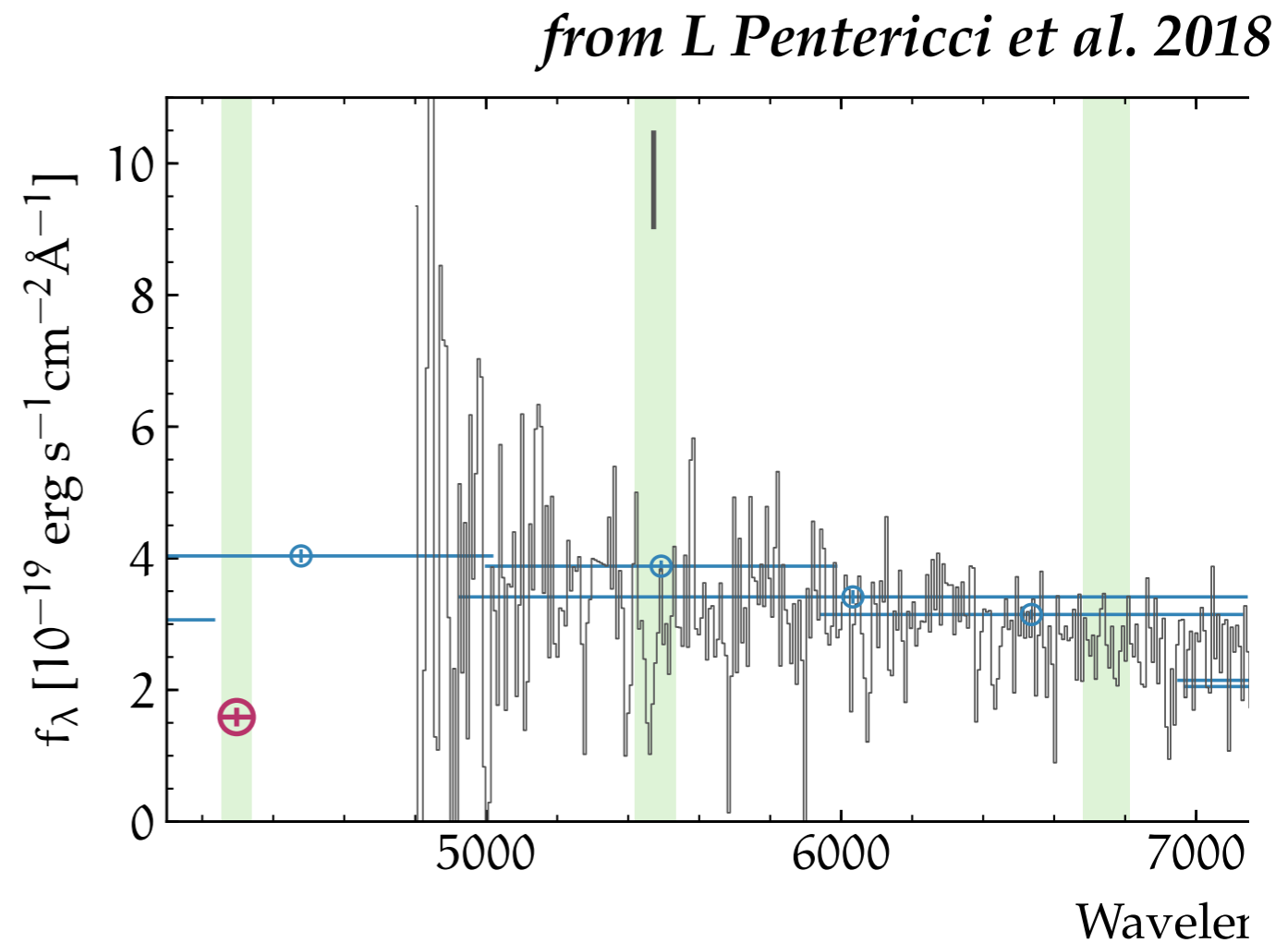
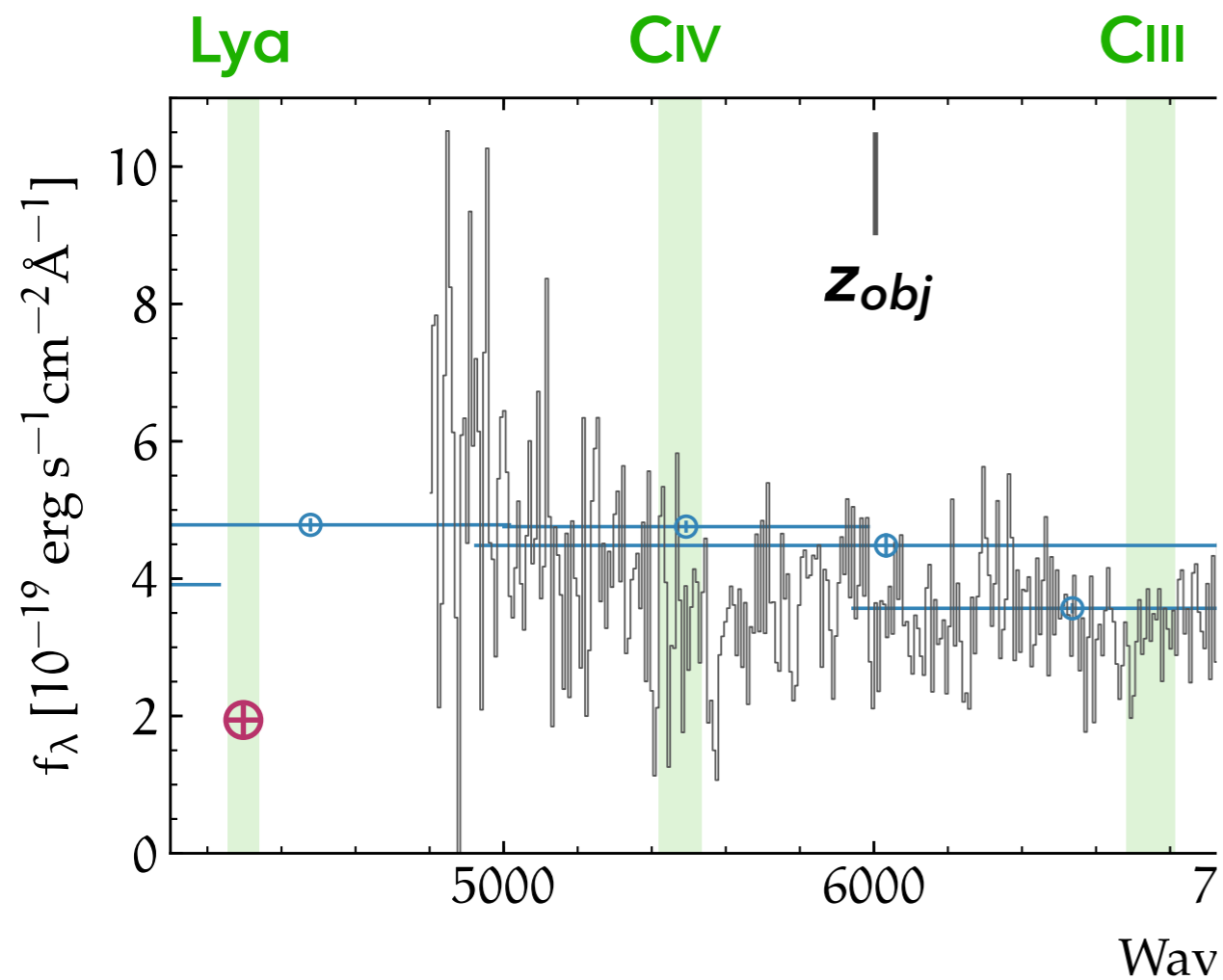
## $EW_{Ly\alpha}$ vs. $E(B-V)$

*HAEs & LAEs (RS+17a),  
and LBGs (A E Shapley et al. 2003)*



# Puzzling NBAs behind the Narrow-band Redshift

From VANDELS Archive Data (VIMOS 20/40 or 40/80 hours)



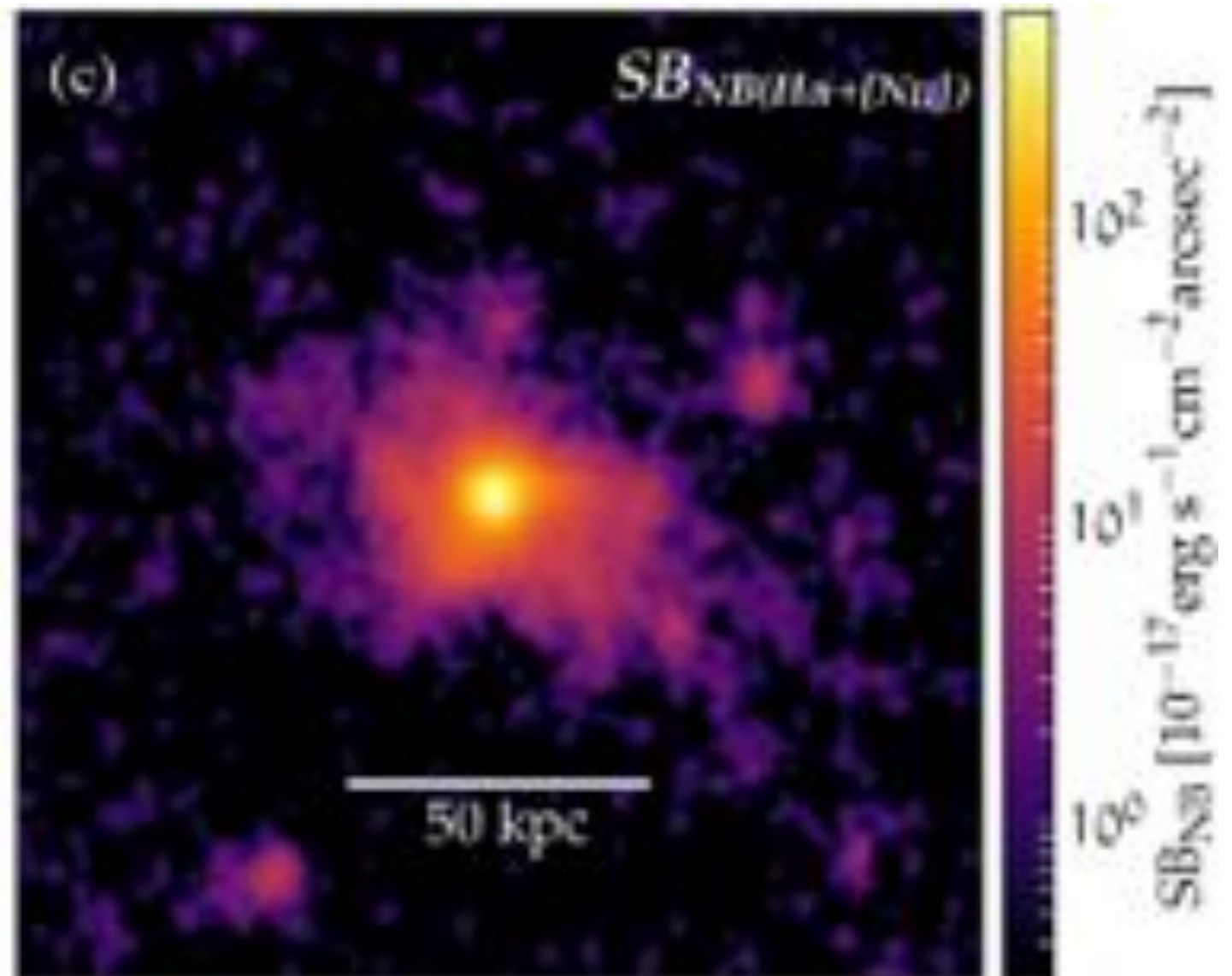
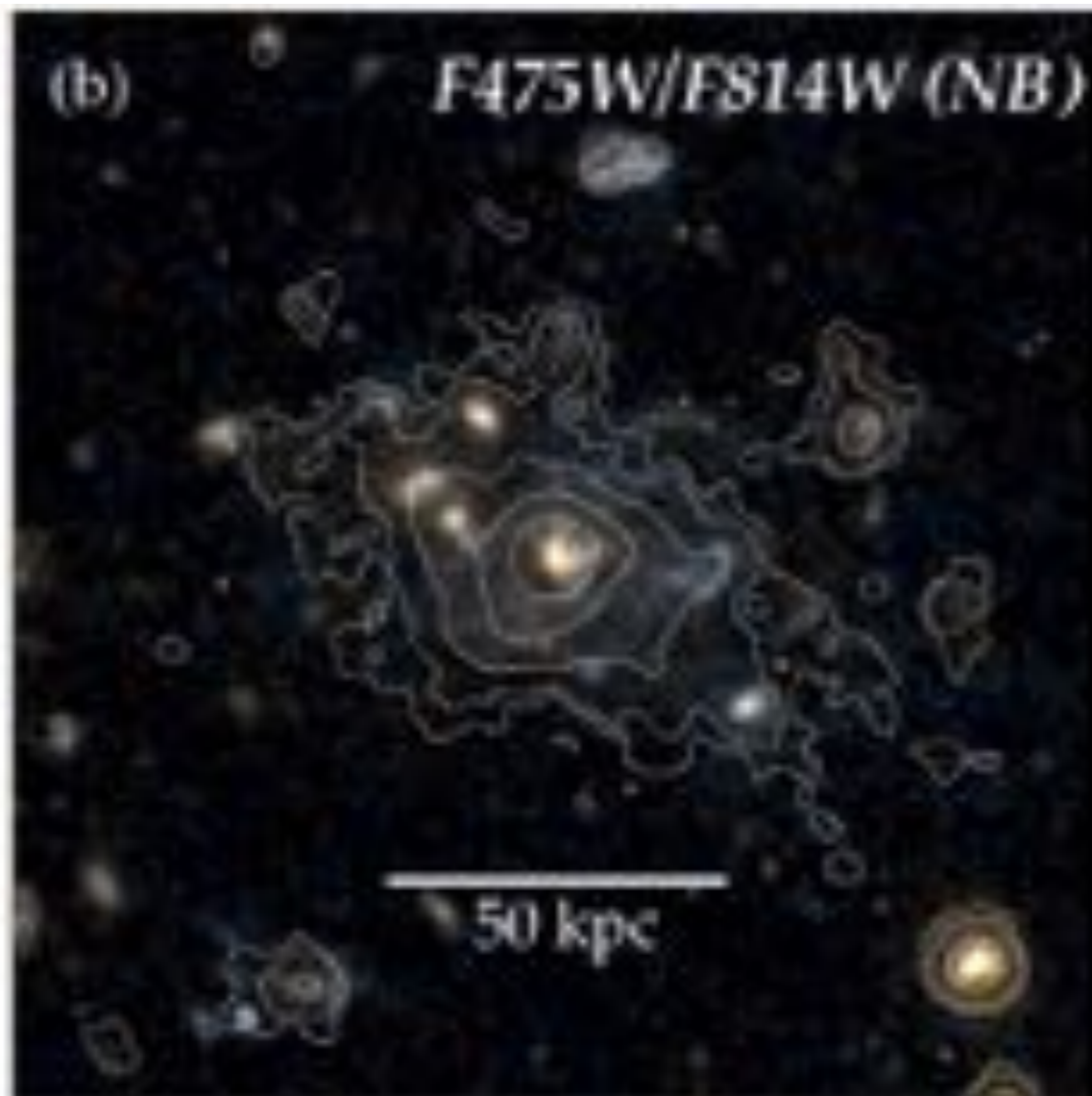
*These are not so helpful ...*

# Diffuse H $\alpha$ Light outside of ISM of galaxies

## Seeking ionizing photons beyond ISM

Huge H $\alpha$  structure surrounding the Spiderweb radio galaxy at  $z=2.16$

*we are now interested in tails of H $\alpha$  emission in more typical galaxies...*

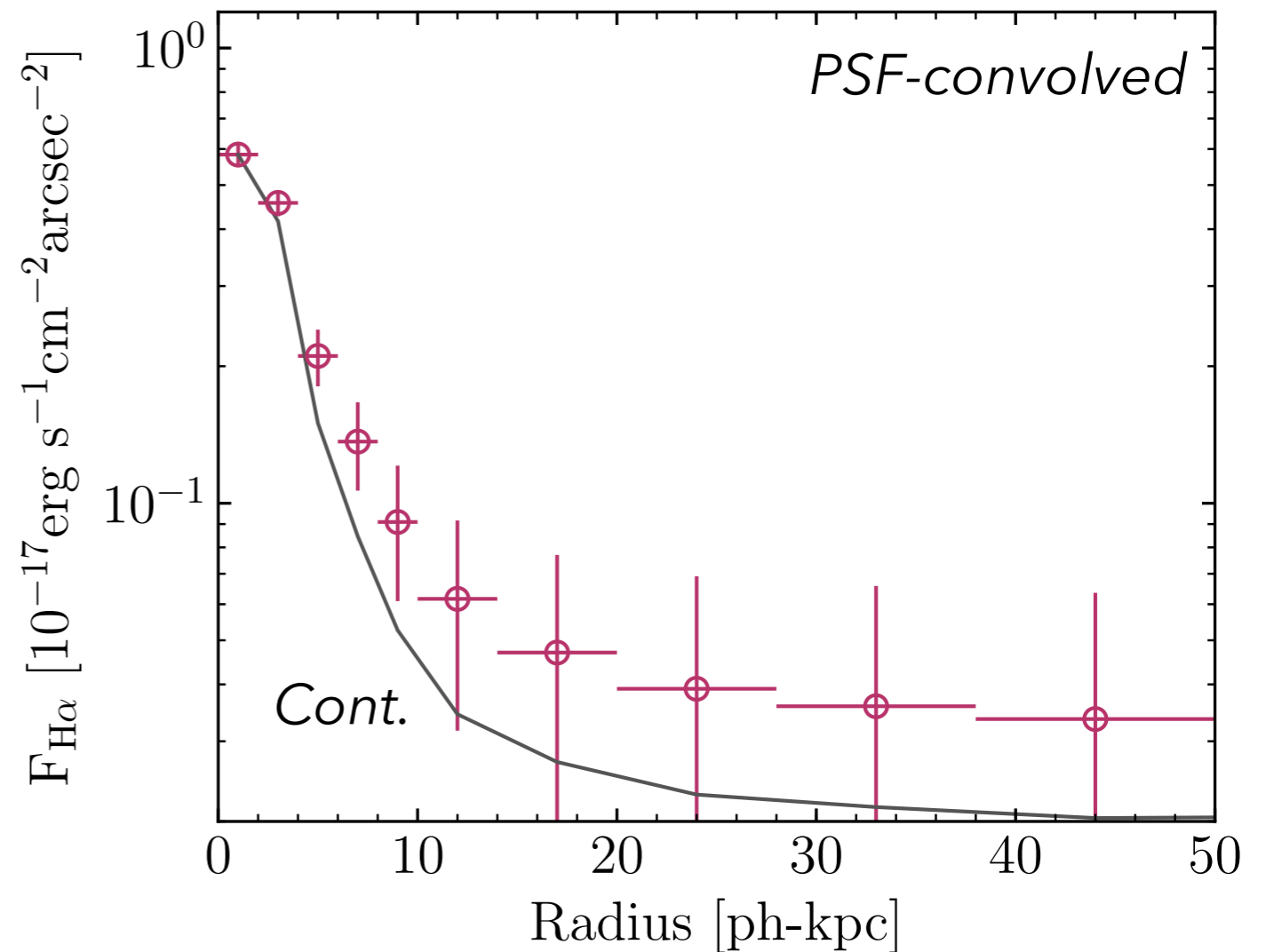
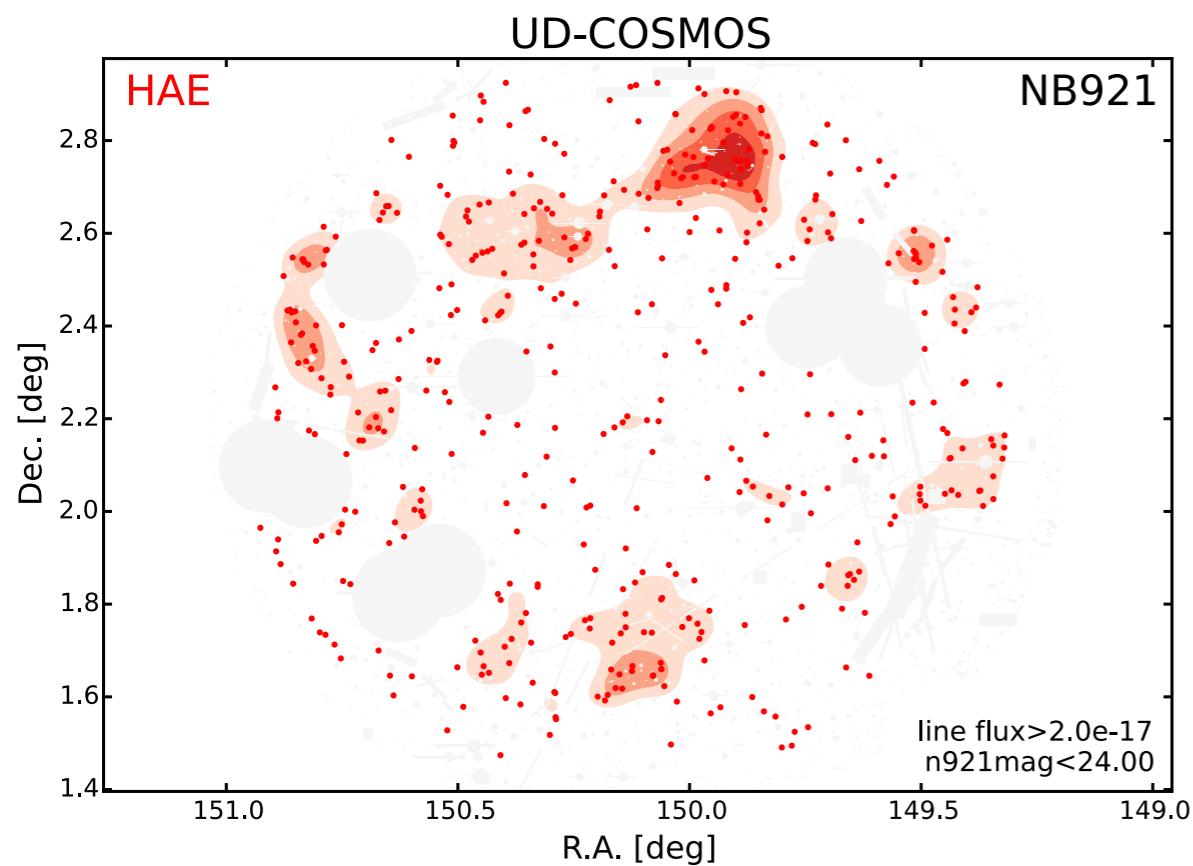


# Radial Profile of H $\alpha$ Emission from a composite image

## Radial Profile of H $\alpha$ (+[NII]) Emission at $z=0.4$

*Preliminary Result*

### HAE catalog by Hayashi+17 based on HSC-SSP DR1



*The data from 641 HAEs in UD-COSMOS (we will increase to ~100k)*



# Scientific Motivation

*J Tumlinson et al. 2017 ARA&A*

Plan for the next year

**Lya morphology at  $z > 2$**

*So far we have only 41 source*

*Random*

*Aligned*

*data?*

*2*

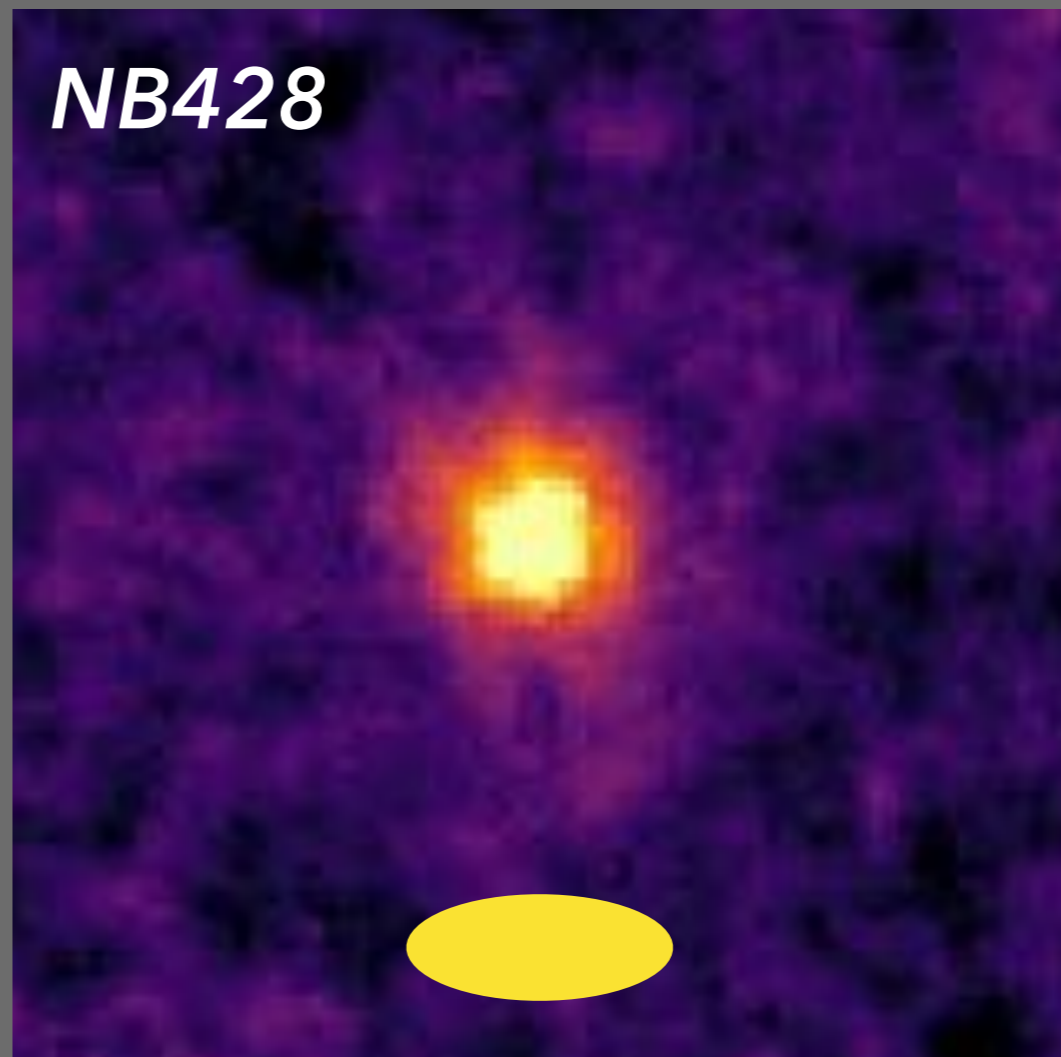
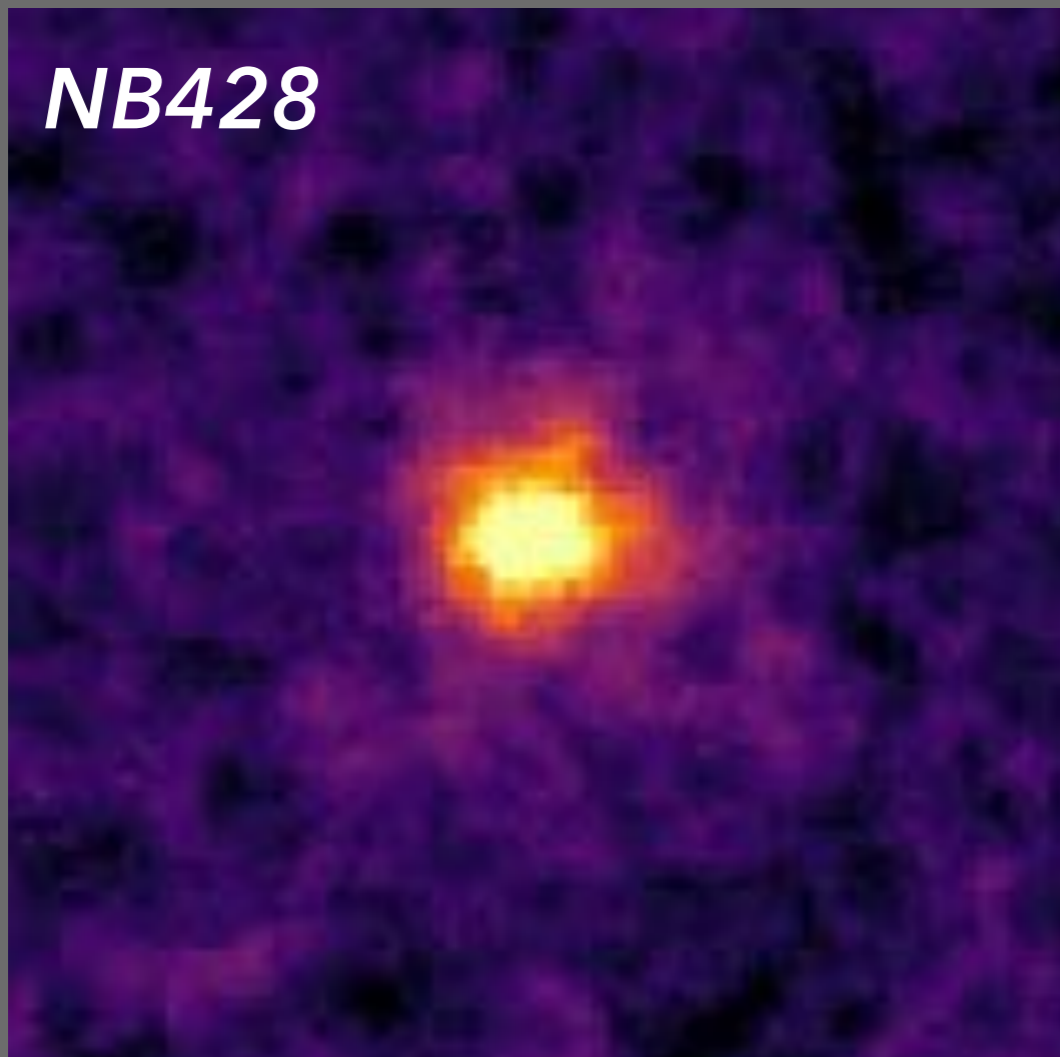
*00k)*

*d join*

*les!*

**NB428**

**NB428**



## Key Issues Towards Next Decades with Subaru

- ★ Significant decline of budget
  - Towards Subaru International Operation
  - How to keep SSP & open use
  - Synergy with TMT and other future telescopes

**Subaru EAO High-z Galaxy Workshop 2019**

**1/31, 2/1 at NAOJ**

*chaired by Zheng Cai (THCA) and RS*

# The 7th Subaru International Conference

The 5th NAOJ Symposium / The 7th Subaru International Conference

**Subaru Telescope 20th Anniversary & Next 20 Years of Science**

**November 2019 at Waikoloa Village, chaired by S Okamoto and RS**

*Theme: All science & instruments. We may include Subaru UM FY2019*

