



DISCOVERY OF FAINT HIGH-Z QUASARS USING MEDIUM-BANDS OBSERVATIONS

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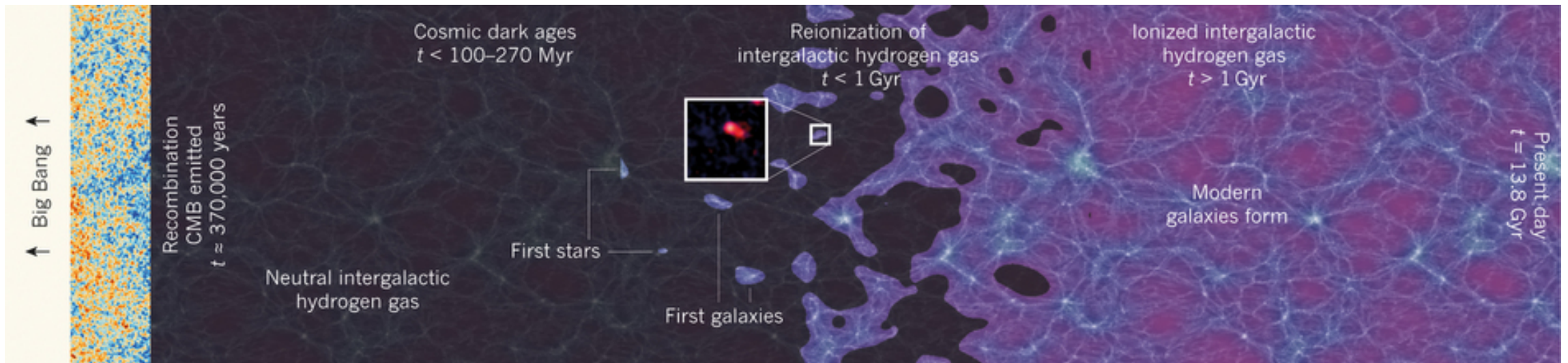
Supervisor : Myungshin Im

Co-worker : Minhee Hyun, Yongjung Kim, and IMS team



Post-reionization era

- Which source is the **dominant contributor** to **keep the universe ionized** in the **post-reionization era**?



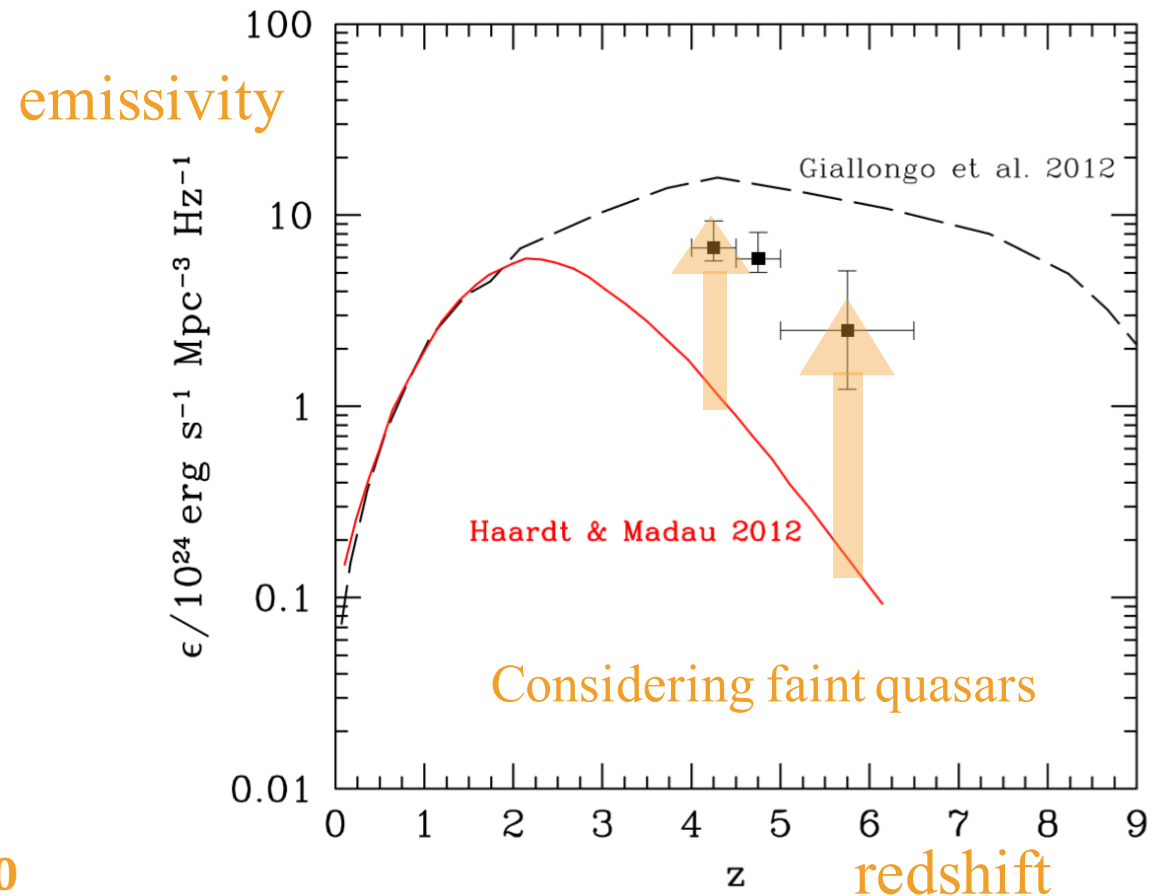
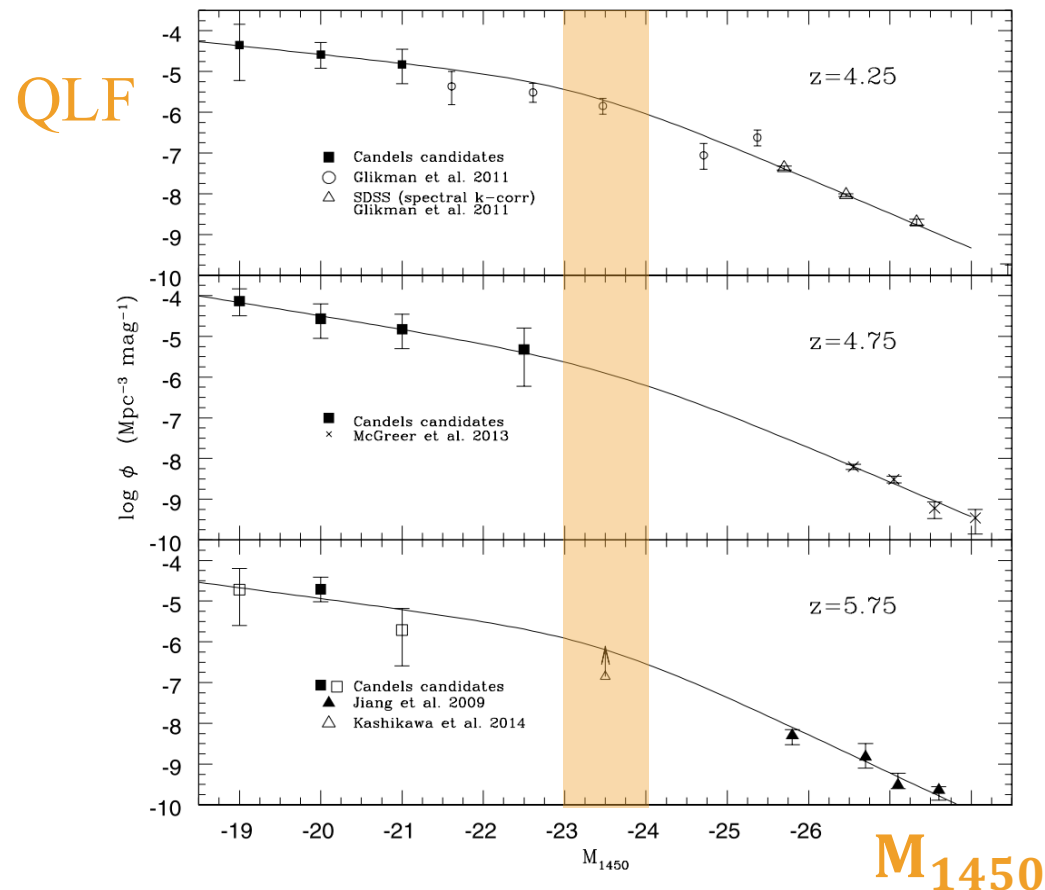
→ Quasars at $z \sim 5$

(Robertson+ 10)

The Faint Quasars at $z \sim 5$

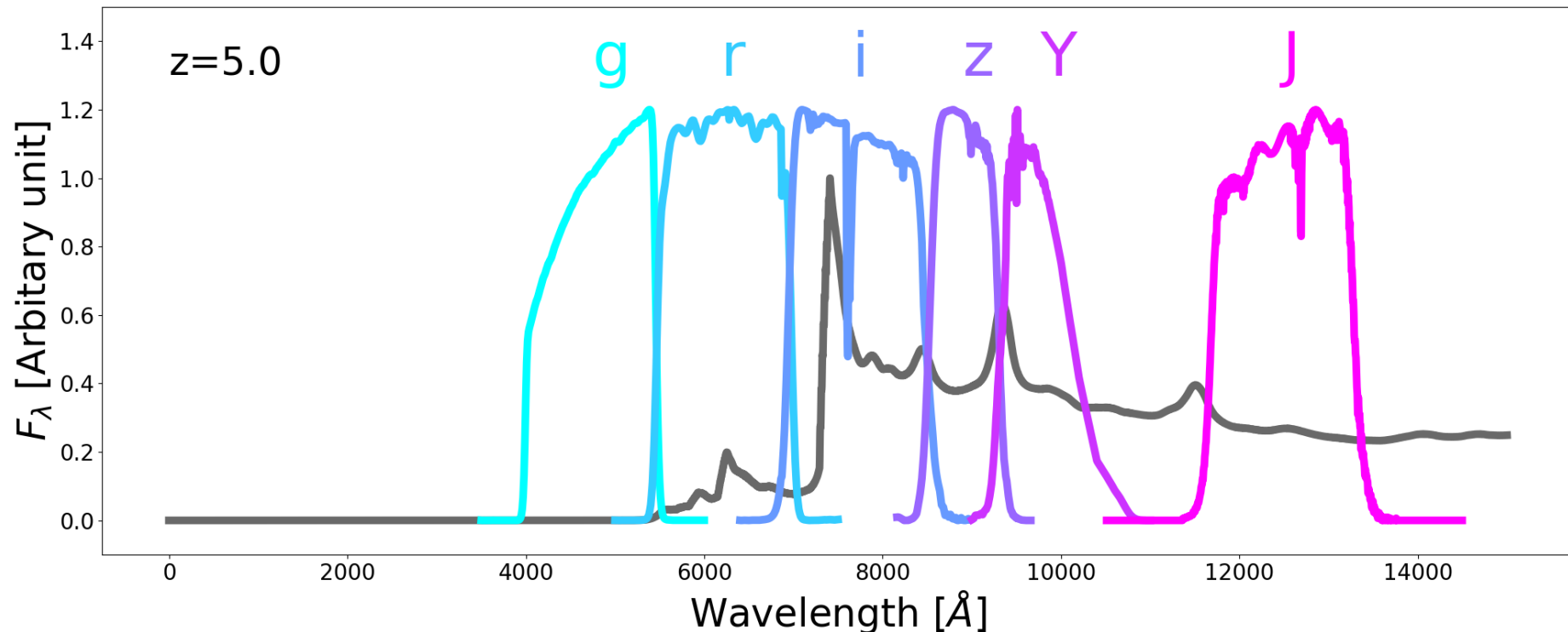
Underestimated number density due to the observation limit

→ **Underestimated emissivity** (Giallongo+ 15) especially at $M_{1450} \sim -23.5$



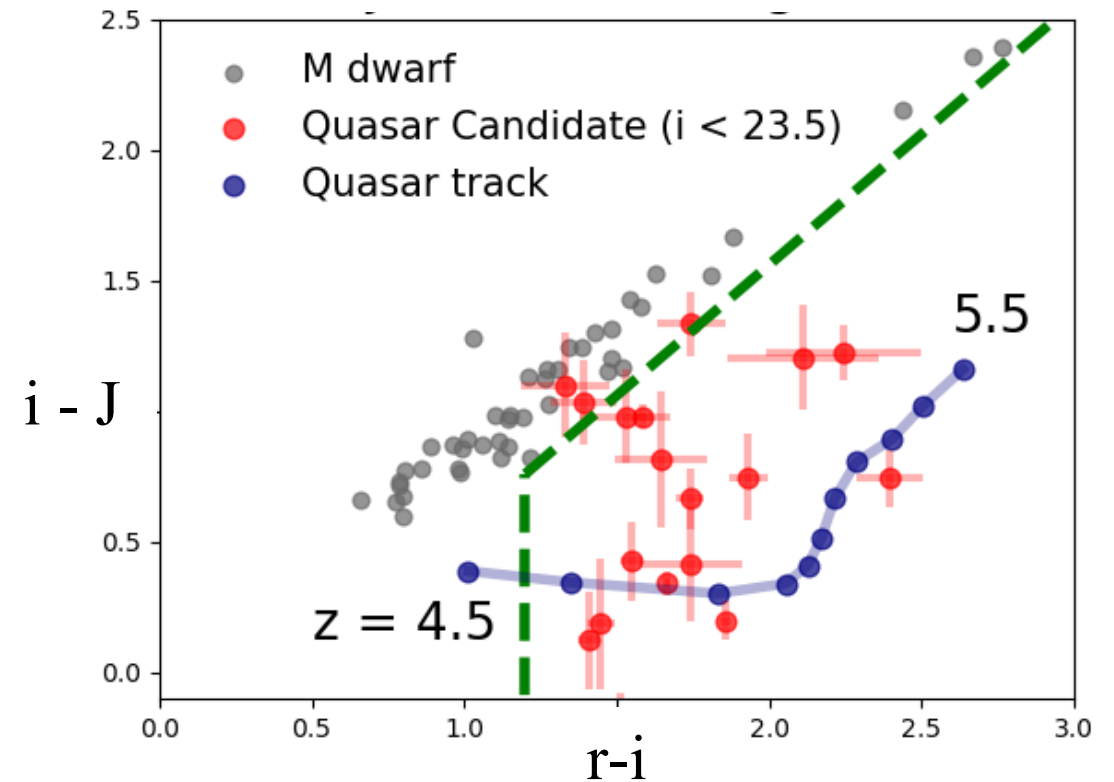
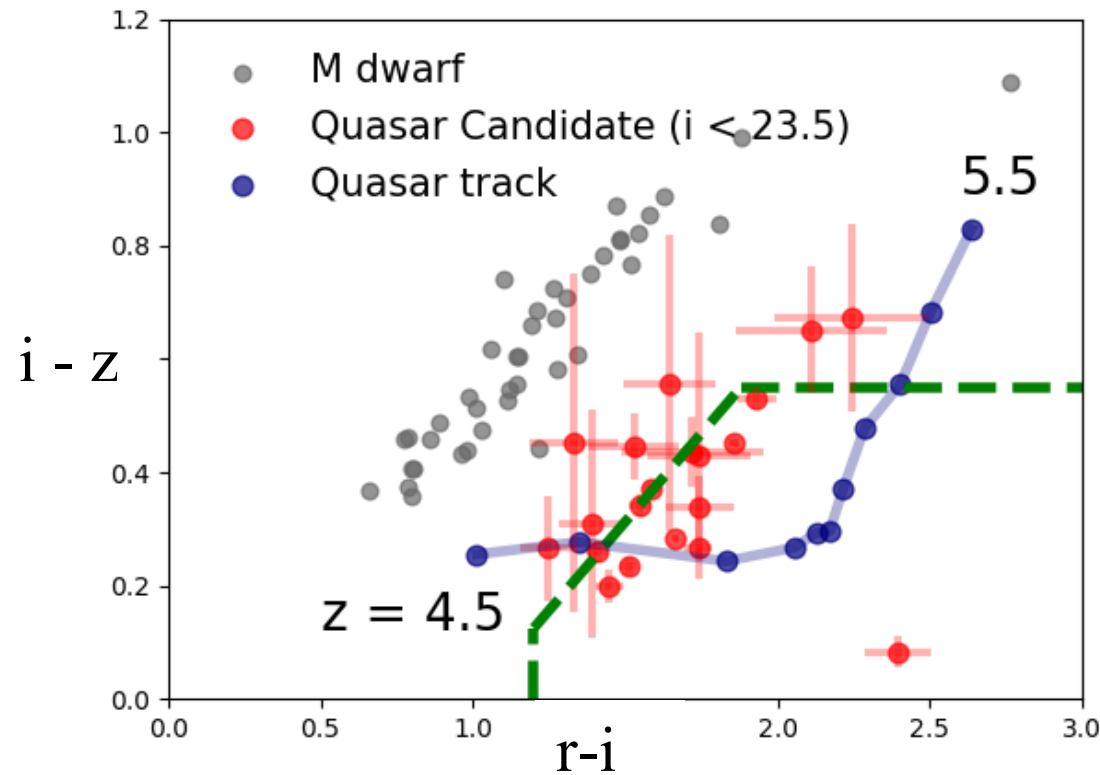
How to Find Quasar Candidates

- A typical spectrum of quasar
- Radiation from QSO absorbed by **neutral hydrogen left in IGM**
 - Using flux differences between bands in photometry → to select high-z qso



Color Selection Criteria (McGreer+ 13)

- Quasars have relatively redder $g - r$ & bluer $i - z$ than M dwarfs
- OPTICAL : g, r, i, z (HSC) & NIR : J (IMS/DXS) magnitude in ELAIS-N1 field



■ Color Selection : 27

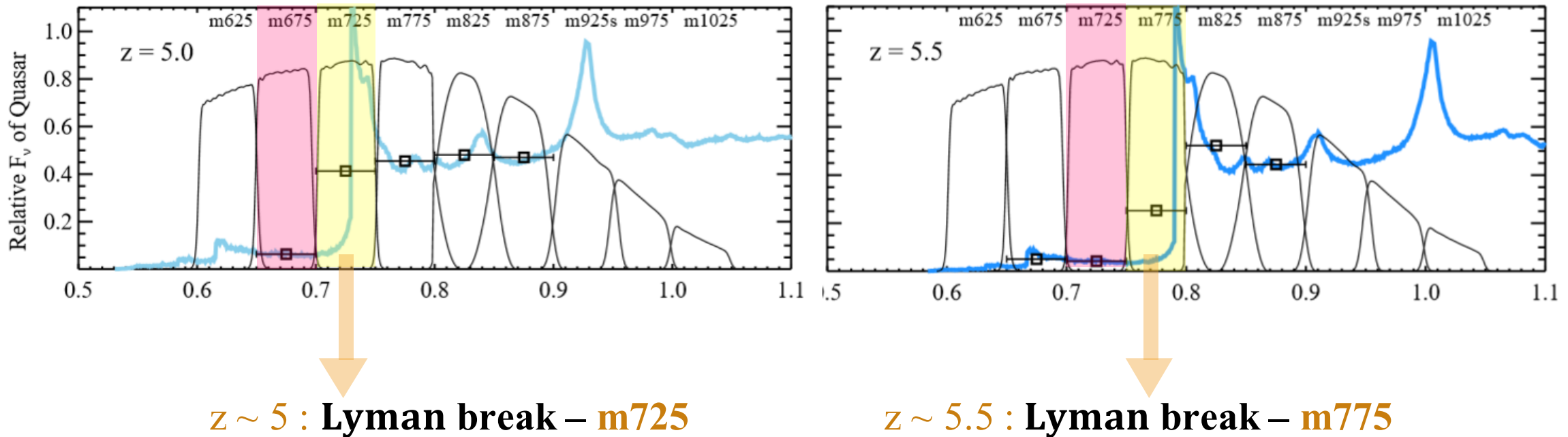


Visual Inspection : 20

Medium-bands observation

- To detect **Lyman break** efficiently (Jeon+ 16, Kim+ submitted)

→ Increase confirmation success rate by selecting more reliable candidates



Medium-bands observation

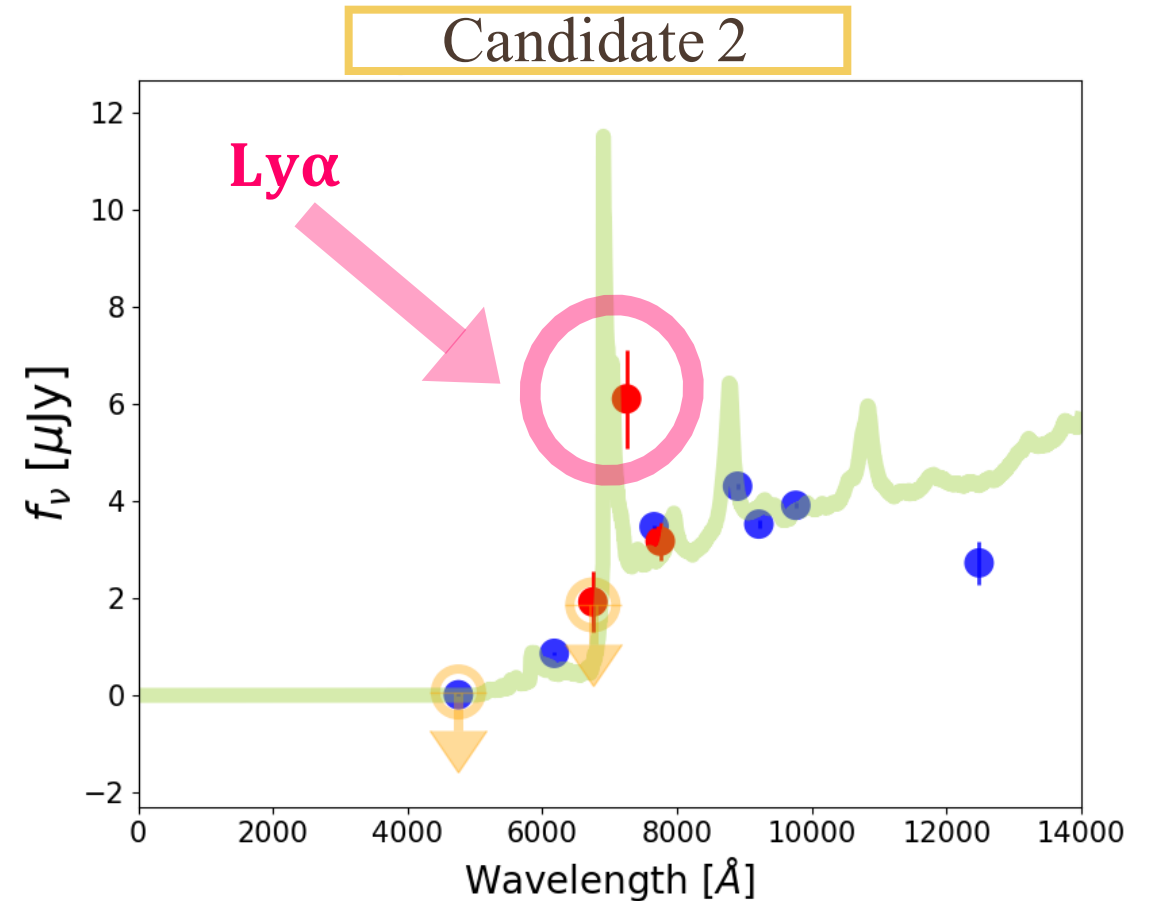
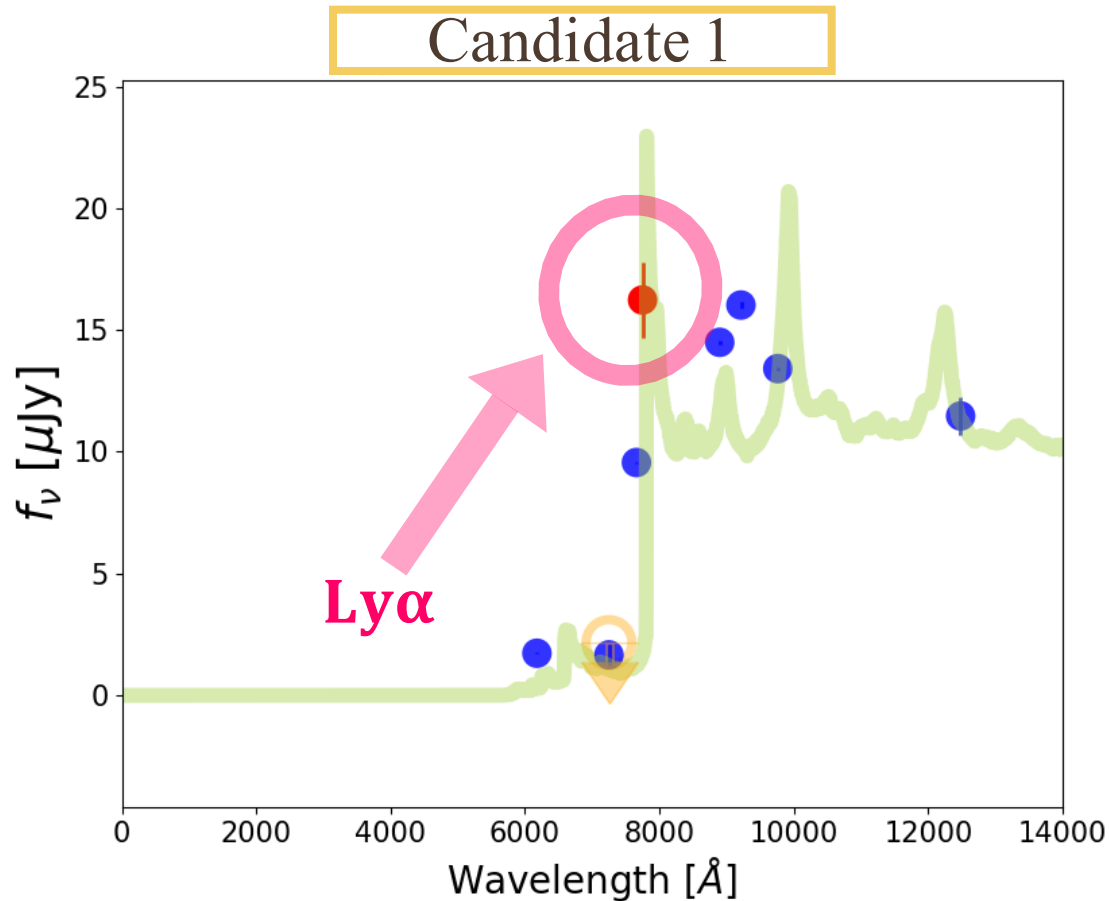
- **12 /20 candidates observed so far**
- **$M_{1450} < -23.5$ ($i_{AB} < 23.5$) can be achieved by 2m-class telescopes**

	17.09	18.02	18.04	18.06	18.08
Telescope	McDonald 2.1 m				Maidanak 1.5 m
Bands	m675, m725, m775, m825				m725, m775
# of Candidates	4	3	6	5	5



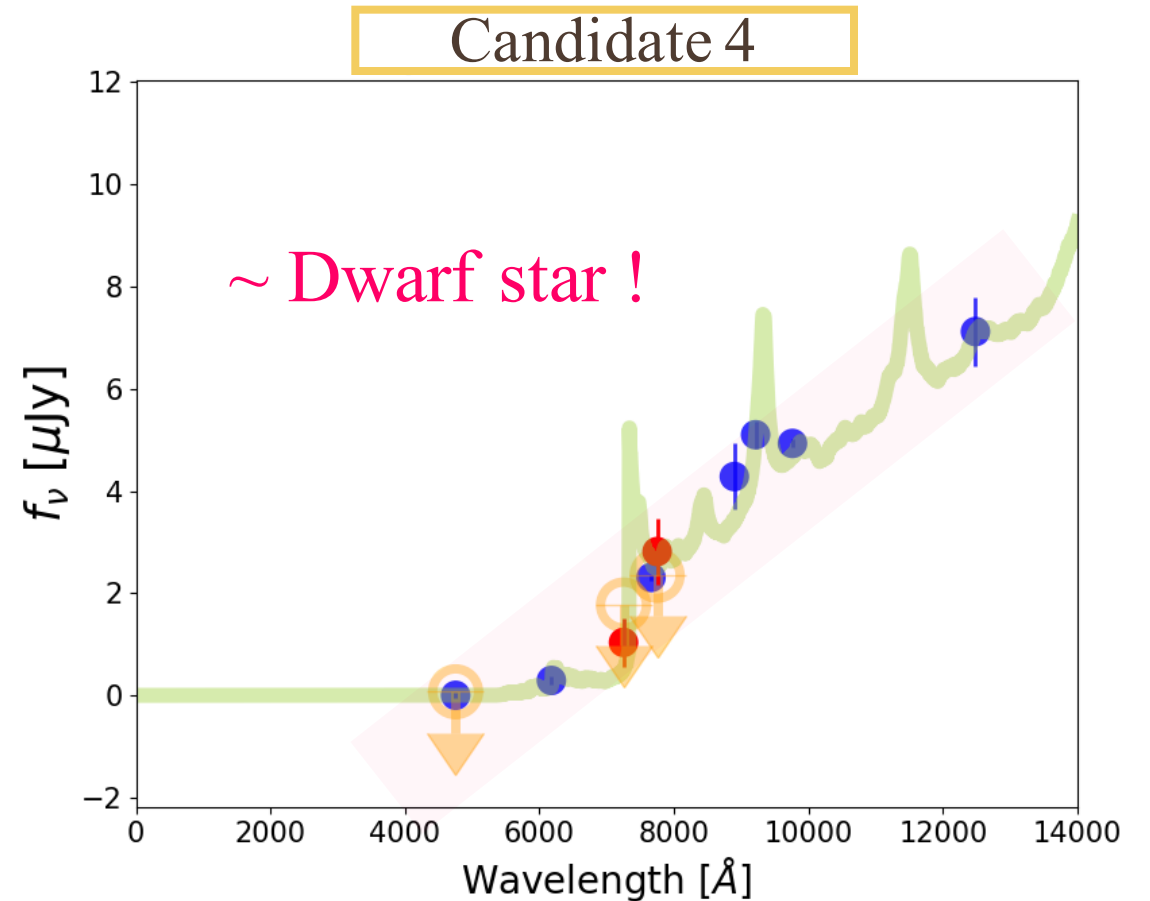
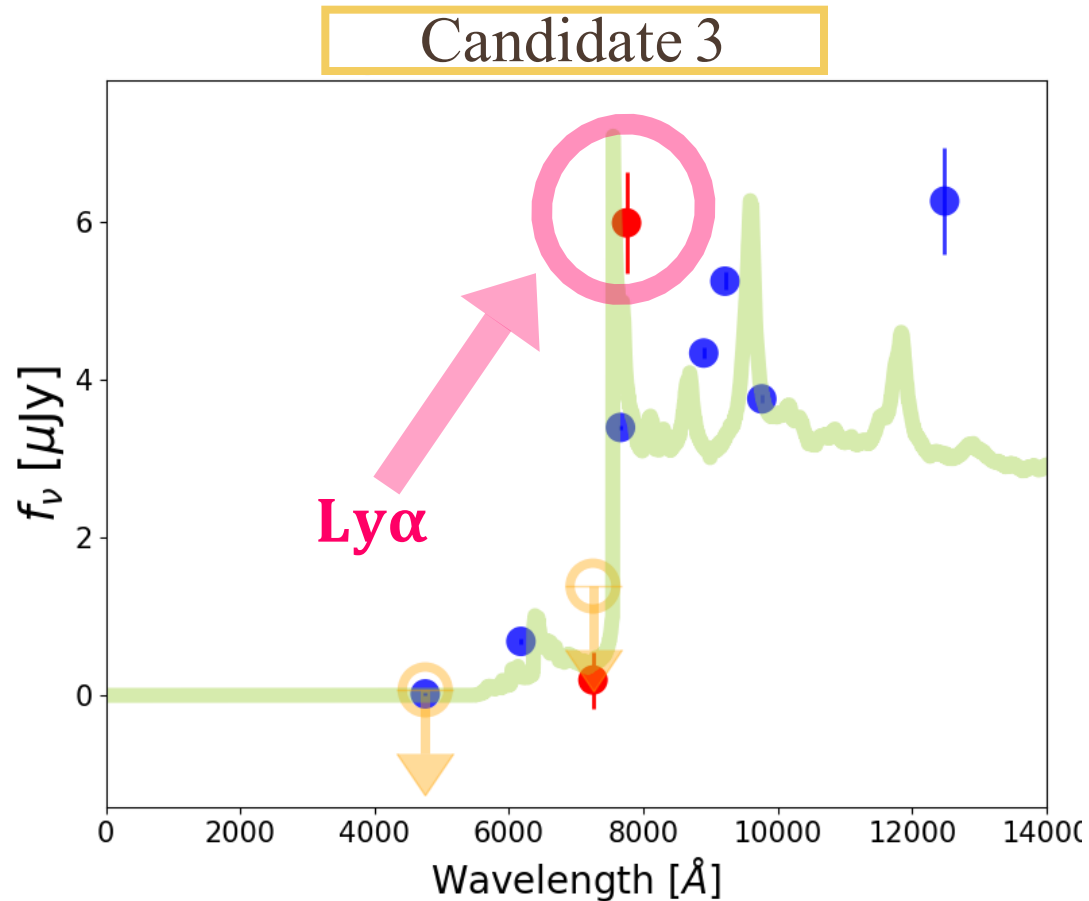
Medium-bands observation results

- Reliable candidates with **clear Lyman alpha emission**



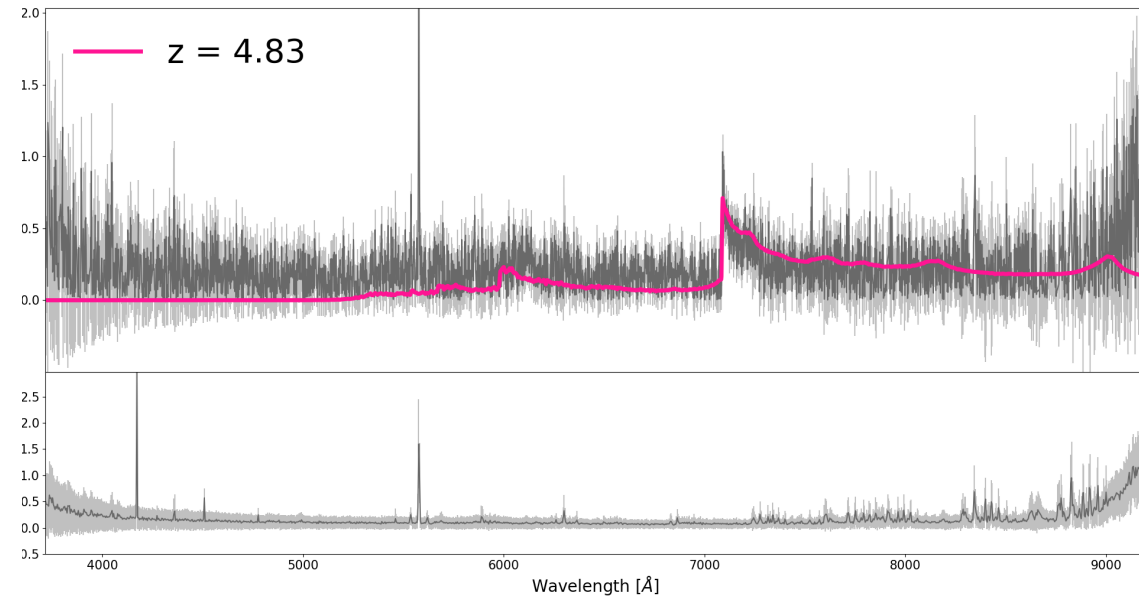
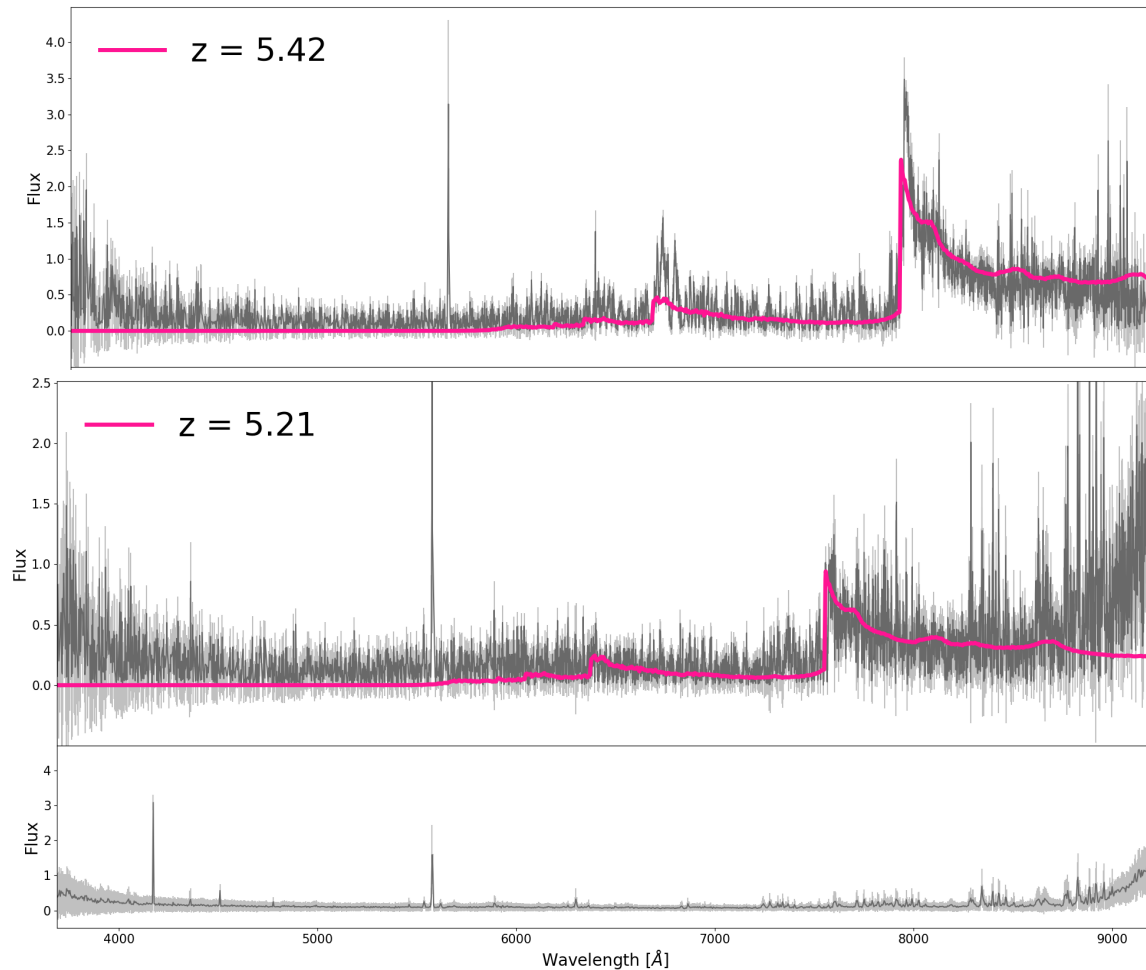
Medium-bands observation results

- Medium-bands observations successfully select high priority candidates



Spectroscopy

- All of 3 candidates are **quasars at $z \sim 5$**



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