High-redshift Quasar Survey with IMS


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High-redshift Quasars

- **Cosmic Reionization**
  - Which objects can fully ionize the neutral hydrogens?

- **X-ray AGN candidates**
  - Cosmic Dark Ages
    - $z > 15-30$?
    - $t < 100-270$ Myr

- **Optical/NIR quasars**
  - Rare sources form ionized bubbles
  - First stars ($z = 15-30$?)
  - First galaxies ($z = 10-30$?)

- **IGM mostly ionized**
  - $z = 0-6$, $t > 1$ Gyr

- **Present day**
  - $z = 0$

- **Reionization**
  - $z = 6-15$?
  - $t < 1$ Gyr

- **Robertson et al. (2010)**

- **Lack of Quasars**
  - $-25 < M_{1450} < -22$

- **Giallongo et al. (2015)**

- **UV emissivity:** $\epsilon \propto \phi \times L$
  - $\phi$: QLF
  - $L$: Luminosity

- **Maximum at $M_{1450} \sim -23.5$ mag**
High-redshift Quasar Survey with IMS

- **Infrared Medium-deep Survey (IMS; M. Im et al, in prep)**
  - Near-infrared imaging survey using WFCAM on UKIRT
  - 120 deg², 5σ depth of $J_{AB} \sim 23$ mag
  - Overlapped with optical data from CFHT Legacy Survey (CFHTLS)

- **Three Steps for Finding Quasars at $z \sim 5$ & 6**
  - Broad-band color selections based on their distinct spectral properties
  - Medium-band observations using SQUEAN on Otto Struve 2.1m Telescope
  - Spectroscopically identification with large telescopes

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![Gemini 8m](image1)

![Magellan 6.5m](image2)
Discoveries & Implication to Reionization

- Discoveries of High-redshift Quasars

- Minor Contribution to Cosmic Reionization

At $z \approx 6$, **Less than 15%** of required UV photons from faint quasars ($-25 < M_{1450} < -22$)

QLFs at $z \approx 5$ & 6 Coming Soon!