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Motivation

- Determine location of high-luminosity (high-mass) quasars on $M_{BH}$ - $\mathcal{V}$ relation
- Determine whether AGN broad-line region geometry depends on luminosity

Gultekin et al. (2009)
Motivation

• Determine location of high-luminosity (high-mass) quasars on $M_{BH} - \mathbb{W}$ relation

• Determine whether AGN broad-line region geometry depends on luminosity

Onken et al. (2004), Nelson et al. (2004), Bentz et al. (2006), Denney et al. (2006)
AGN Black Hole Mass Estimates

- Most direct method to measure AGN black hole masses is through reverberation mapping:

\[ M_{BH} = f \frac{R_{BLR}(\Delta V)^2}{G} \]

- \( R_{BLR} \): derived from time delay between continuum and emission line variations
- \( \Delta V \): measure of the BLR velocity
- Scale factor \( f \) accounts for unknown geometry of BLR

- We measured the bulge stellar velocity dispersion for the host of a luminous quasar: PG 1426+015
Gemini North Observations of PG 1426+015

• Altair laser guide star adaptive optics (LGS AO) system
  - LGS AO concentrates quasar emission into central few pixels

• Near-Infrared Integral Field Spectrometer (NIFS)
  - IFU captures more host galaxy light than longslit spectrograph
Velocity Dispersion Measurement


- K5 III, M1 III, and M5 Ia templates

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PG 1426+015 on the $M_{\text{BH}}$ - $\sigma_*$ Relation

- PG 1426+015 lies above the $M_{\text{BH}}$ - $\sigma_*$ relation

- Possible reasons:
  - Scale factor, $f$, may be different for different populations
  - Selection bias
  - Small number statistics
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Grier et al., in prep.
Conclusions

• Used the Gemini North Near-Infrared Integral Field Spectrometer (NIFS) and laser guide star adaptive optics to measure the stellar velocity dispersion in the host of a luminous quasar

• PG 1426+015 lies significantly above the quiescent galaxy $M_{\text{BH}}$ - $\mathbb{W}$ relation

• More observations will help to determine why high-mass quasars seem to lie above the $M_{\text{BH}}$ - $\mathbb{W}$ relation
• Lauer et al. (2007) selection bias: