HOST GALAXIES OF HIGH REDSHIFT QUASARS

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LOW REDSHIFT QUASAR HOSTS

luminous (massive) bulge-dominated galaxies

products of successive mergers?

inactive BHs in nearby massive bulges
quasar = accretion onto BH

=> all massive galaxies have been quasars?
BH accretion rate vs cosmic SFR history

⇒ formation and evolution of BHs and galaxy bulges strongly linked

⇒ crucial to study high z quasars and their hosts
**Space**  excellent PSF

small collecting area and FoV

**Ground**  very good PSF

large collecting area and FoV

$z = 1.5$
QUASAR HOSTS AT HIGH REDSHIFTS


• 17 luminous and 15 low luminosity quasars (VLT+ISAAC)
claims for host detection at $z > 2$

two RLQ and two RQQ hosts (VLT+NACO); up to $z \sim 2.9$

$z = 2.55$
Nuclear vs host galaxy luminosity

RLQ nuclei are redder in U-R than RQQs

differential extinction by dust?

intrinsic difference in SEDs? (e.g. synchrotron component in NIR)

R-band better tracer of $L_{\text{bol}}$ than U-band?

reasonable correlation for RLQs

narrow distribution of Eddington ratio

scatter due to dispersion in $M_{\text{BH}} - M_{\text{bulge}}$ and varying accretion rate?
Evolution of quasar hosts

no decrease in luminosity? => massive BHs in place by \( z = 3 \)

=> early epoch for the latest major merger

decrease in luminosity at \( z = 2.5 \) ?

=> evidence for tight quasar - host co-evolution
need high S/N and spatial resolution

NGS AO systems do not allow sizeable samples

need very close reference + PSF stars

1) luminous quasars: AO
VLT + NACO + LGSF (P78 => )

2) low luminosity quasars: non-AO
large FoV => many PSF stars => accurate PSF shape
16 RQQs with VLT + ISAAC (P77)
AND: EVOLUTION OF $M_{\text{BH}} - M_{\text{bulge}}$ CORRELATION

- High z inactive galaxies: $M_{\text{bulge}}$ easy, $M_{\text{BH}}$ impossible
- High z quasar hosts: $M_{\text{bulge}}$ difficult, $M_{\text{BH}}$ easy

$$v_{\text{BLR}} + R_{\text{BLR}} \Rightarrow \text{virial } M_{\text{BH}} = v_{\text{BLR}}^2 R_{\text{BLR}} G^{-1}$$

$v_{\text{BLR}}$: FWHM of BLR emission lines
$R_{\text{BLR}}$: continuum luminosity

ESO 3.6m/EFOSC2: spectra of resolved quasars at $z > 1$
images $\Rightarrow M_{\text{bulge}}$, spectra $\Rightarrow$ virial $M_{\text{BH}}$

Sept 2005, Mar 2007 18 quasars
more to come: Sept 2007 5 N