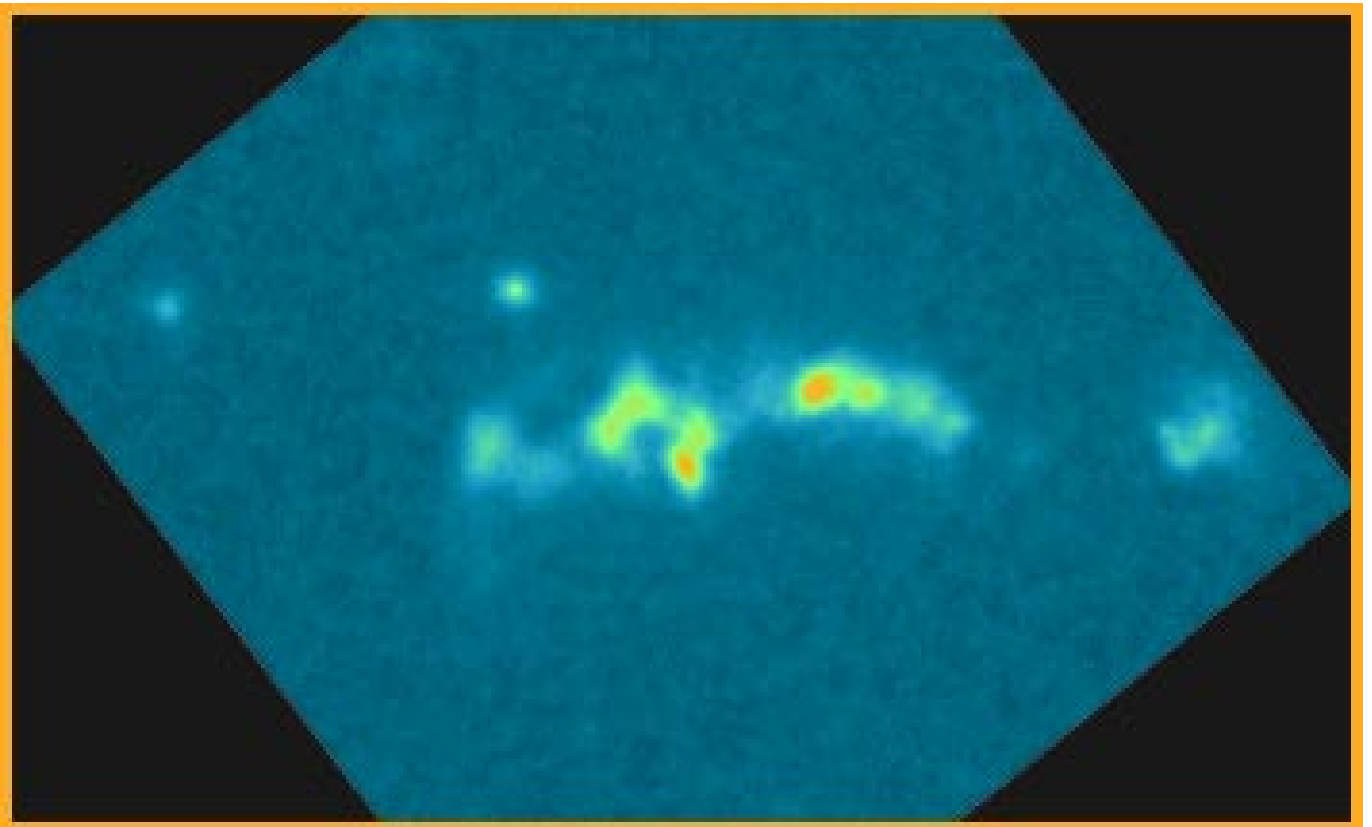


Quasar hosts

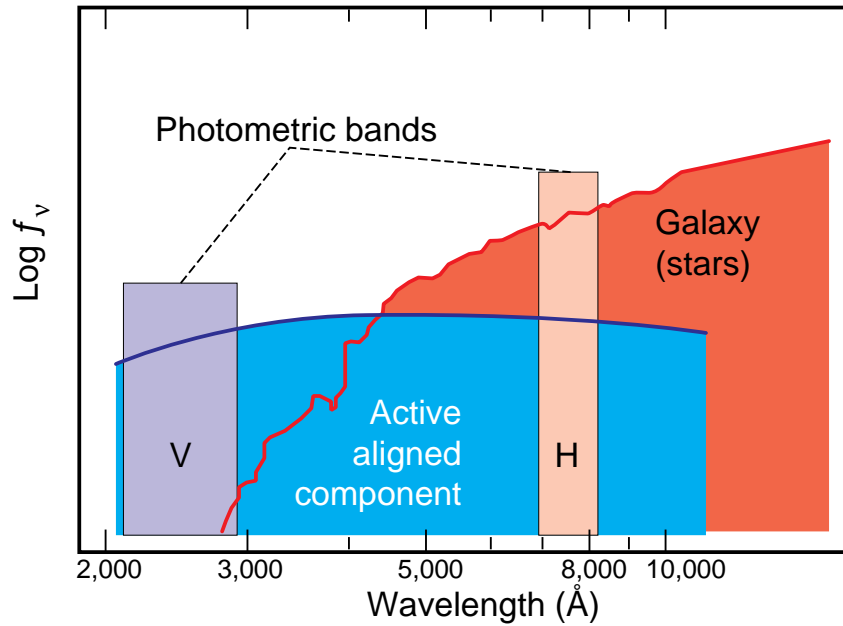
Introductory remarks

In our observations of these active objects, how do we differentiate between the stellar evolutionary processes in the galaxy and the AGN-induced extranuclear phenomena?



*3C 324 (z=1.2) HST, PC (F702W) observation
courtesy Mark Dickinson & Richard Hook*

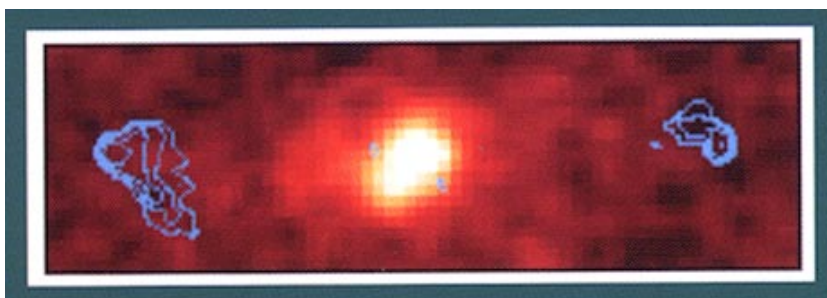
The importance of rest-frame waveband



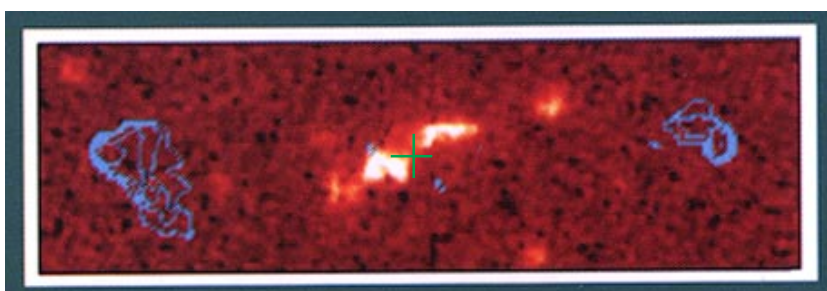
In the high-redshift radio galaxies which exhibit the alignment effect, the observed properties above and below the 4000\AA break are different

The longer wavelength images are smoother, rounder and more 'elliptical-like'

The rest-frame UV images are clumpy, elongated and generally polarized



3C 324
UKIRT, K



HST, F814W
(Best, Longair & Röttgering)

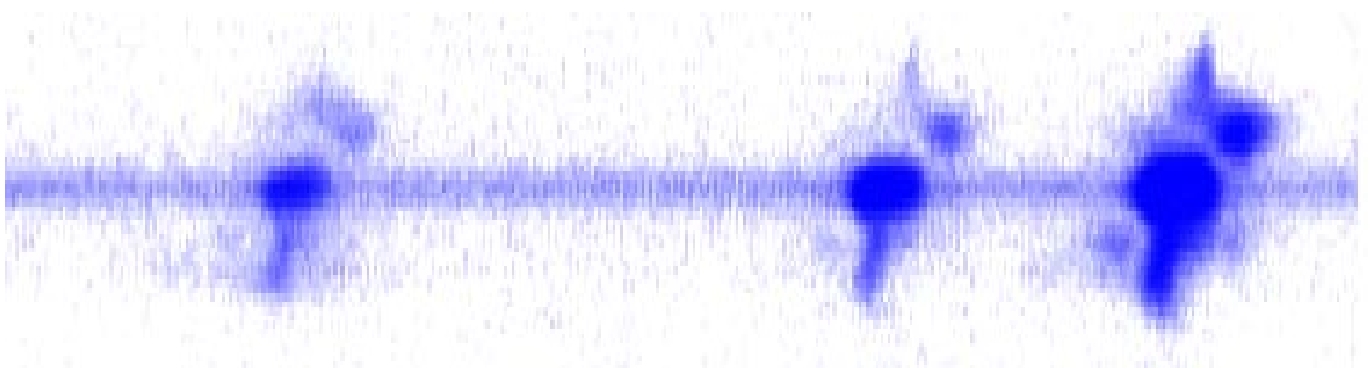
Contributors to the extended light in the radio galaxies

- ❑ Starlight (seen above the 4000\AA break)
- ❑ Nebular continuum
- ❑ Extended emission lines (ionized by a hard continuum) with kinematically disturbed components (see 3C 171 below - Tadhunter et al.)
- ❑ Scattered quasar continuum
- ❑ Scattered quasar broad lines, eg. Mg II
- ❑ Scattered quasar (high critical density) narrow lines, cf. the [OIII] vs. the [OII] Jackson-Browne test

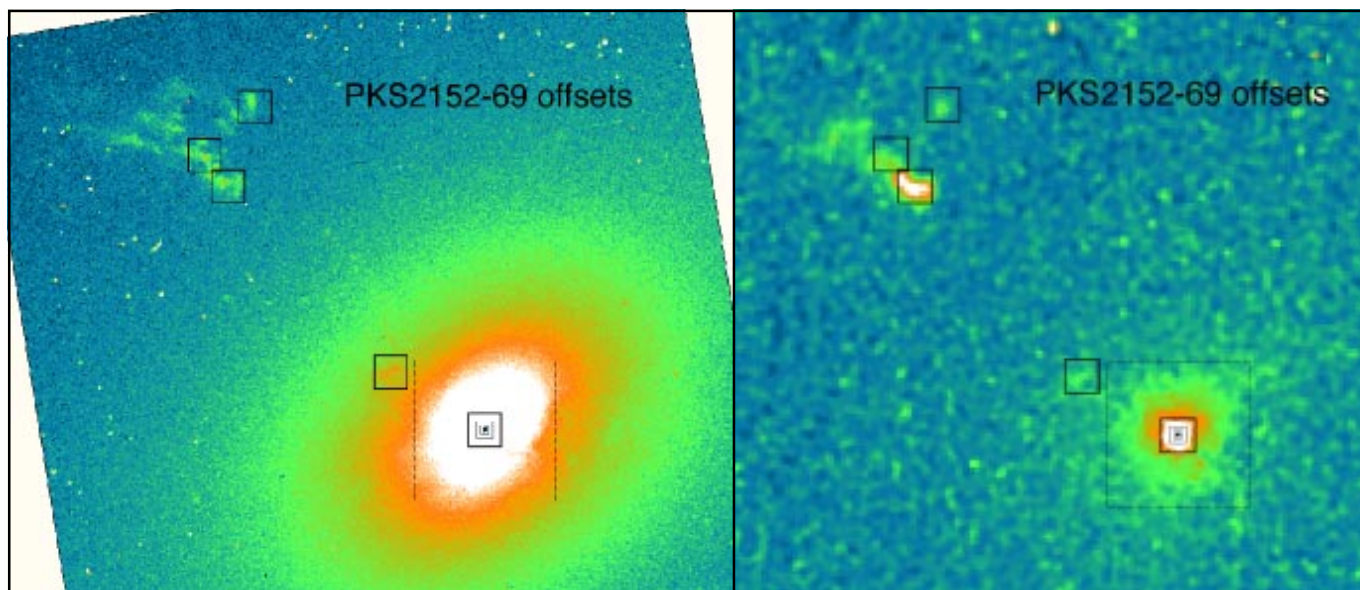
The scattered components are measured using imaging- and spectro-polarimetry

Extranuclear physical processes

- ❑ Photoionization of the ISM by the AGN
- ❑ Scattering of the AGN radiation by dust and electrons
- ❑ Jet/cloud interactions and associated shocks
- ❑ AGN-induced star formation

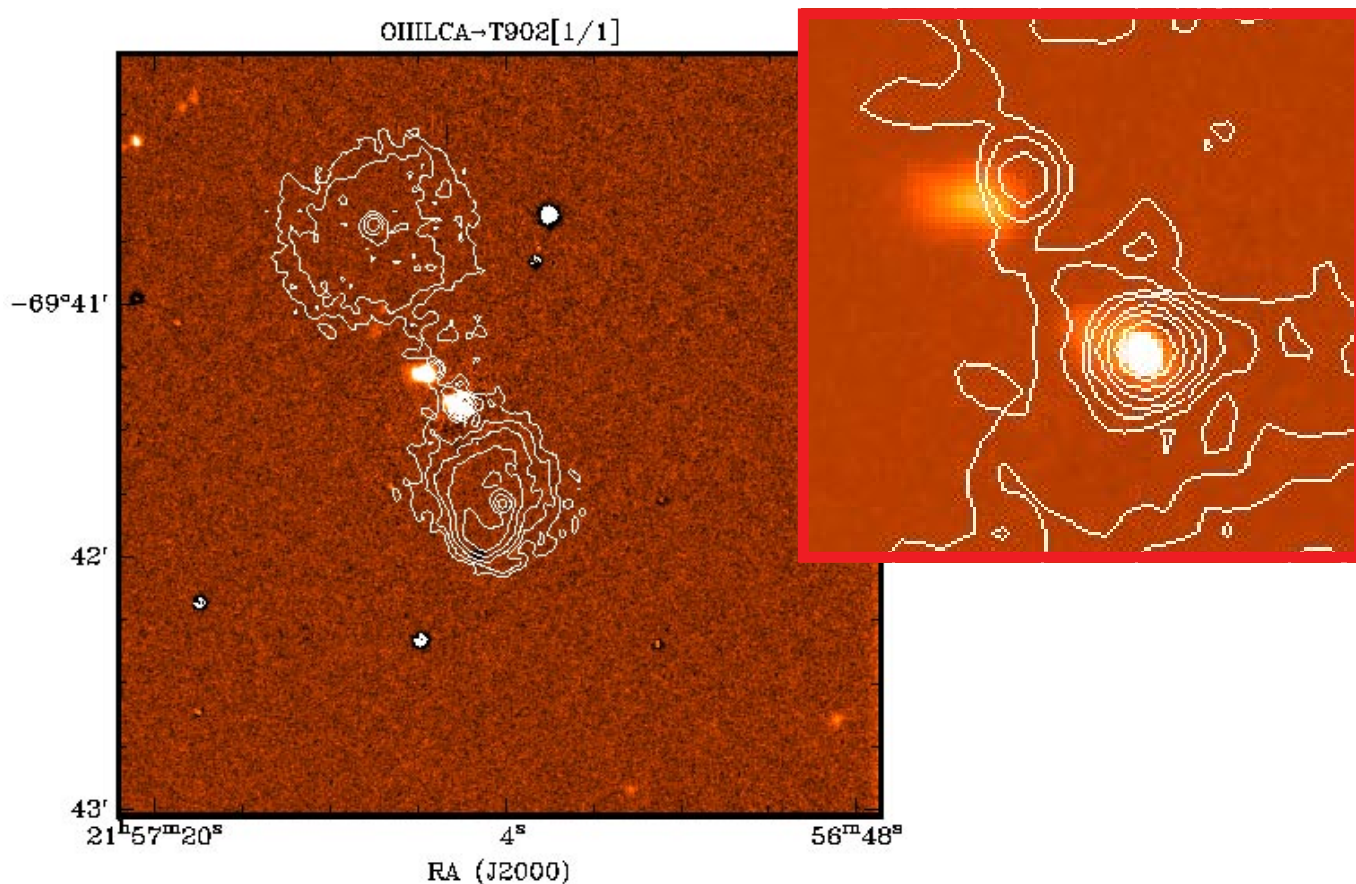


Example of jet/cloud interaction in PKS 2152-69



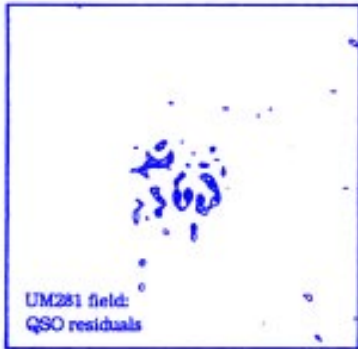
HST, F606W

F300W

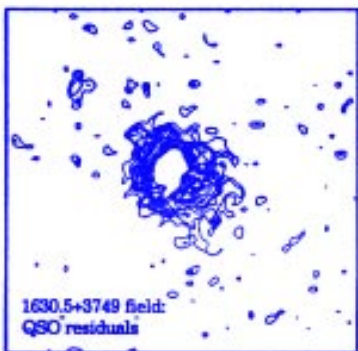


AT 6cm + NTT [OIII]

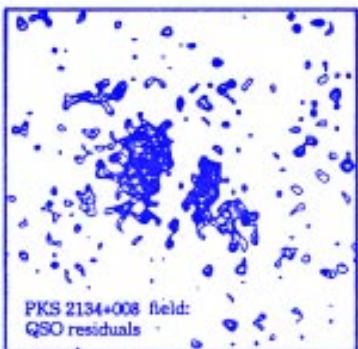
What do the phenomena observed in the galaxies imply for observations of the quasars?



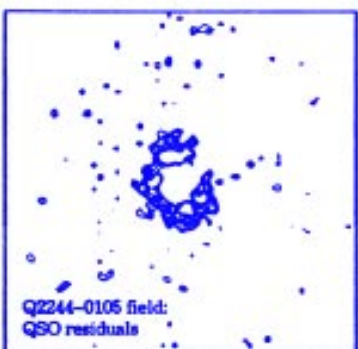
If the powerful radio galaxies and the radio quasars are from the same parent population, the quasars must exhibit pseudo-hosts



These will be most apparent at shorter wavelengths where the AGN-induced activity dominates over a cool stellar population



These pseudo-hosts will contain the same components that we see in the aligned radio galaxies — but the scattered component will be relatively enhanced by the forward directed phase-function of the scattering particles



The magnitude of the effect can be estimated from the properties of the 3CR sample at a redshift around 1. We expect 10–15% of the quasar light to form a non-stellar pseudo-host

*Aretxaga, Boyle
& Terlevich, 1995*

This hypothesis may be difficult to test using polarimetry, but high spatial resolution long-slit spectroscopy with HST is promising

Some of the new observational techniques since the 1989 ESO workshop on extranuclear activity

- ❑ HST -> high spatial resolution with high dynamic range
- ❑ Keck -> revolution in polarimetric capability etc!
- ❑ Revolution in near- and mid-IR capability
- ❑ Improvements in ground-based resolution (AO)
- ❑ FIR -> mm bracketing of the cool dust emission spectrum
- ❑ Ability to measure the molecular gas at high z
- ❑ Higher resolution and sensitivity of the x-ray observations
- ❑ '3D' spectroscopy

Some of the open questions

How is the star formation and the AGN formation coupled?

Will observations of the underlying galaxies resolve the radio loud/quiet dichotomy?

The nature of the radio quiet 'radio galaxies' at high redshift?