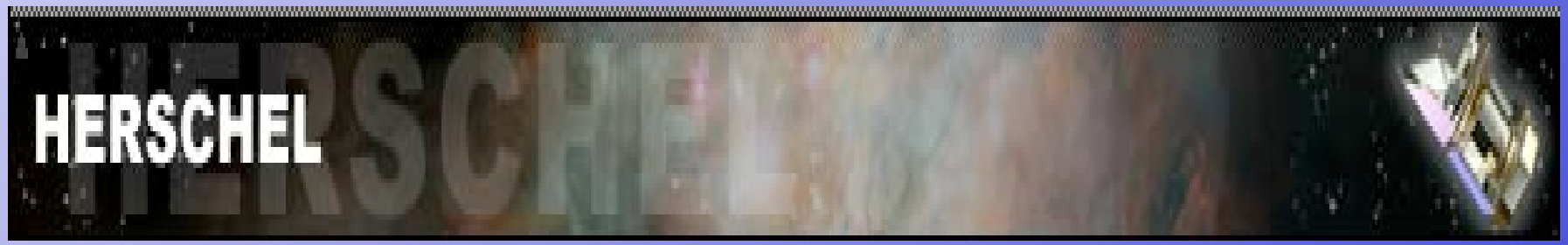
Spitzer-Herschel Active Galaxy Survey

University of Hertfordshire

Matt Jarvis



The role of AGN in the Universe

We now think that accretion activity in the Universe is extremely important in the evolution of all massive galaxies.

SNe

AGN

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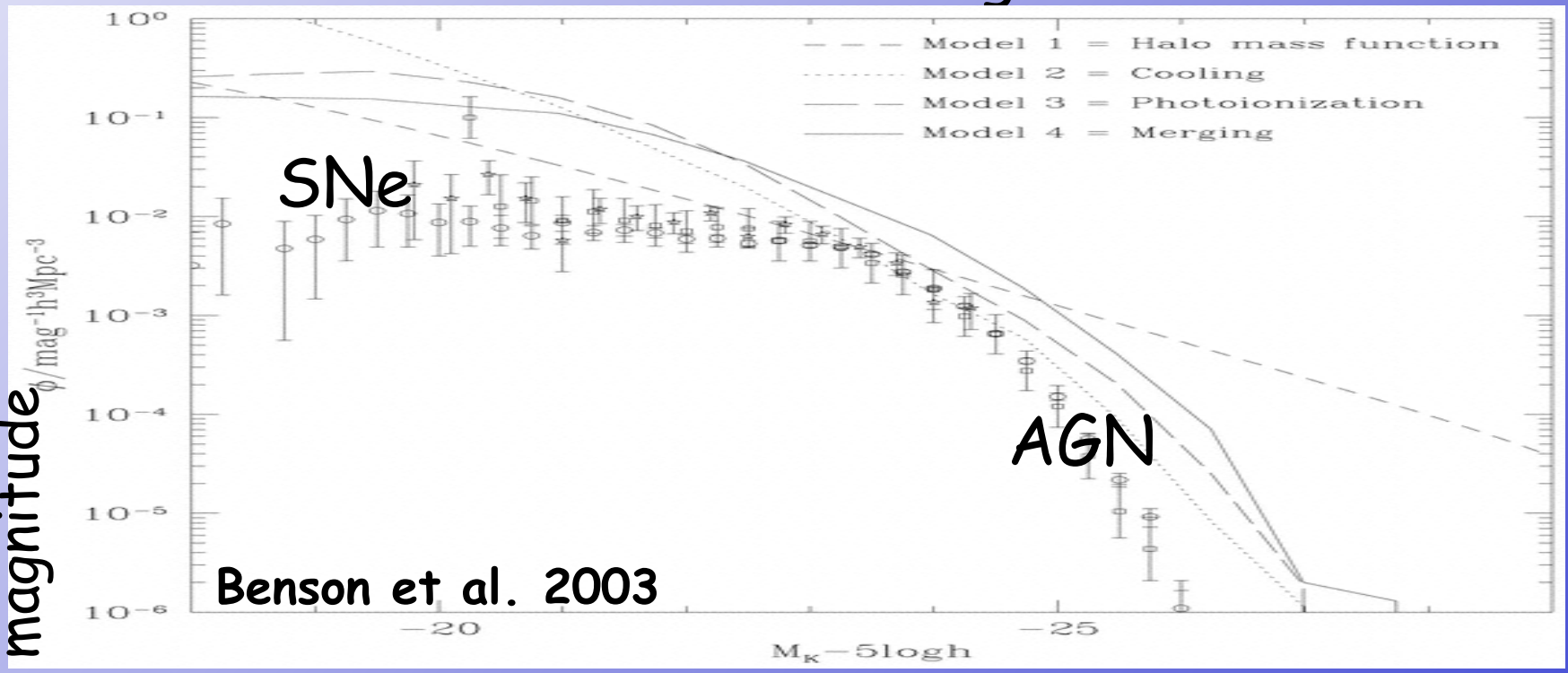


Density of galaxies / magnitude →

Luminosity →

The role of AGN in the Universe

We now think that accretion activity in the Universe is extremely important in the evolution of all massive galaxies.

SNe

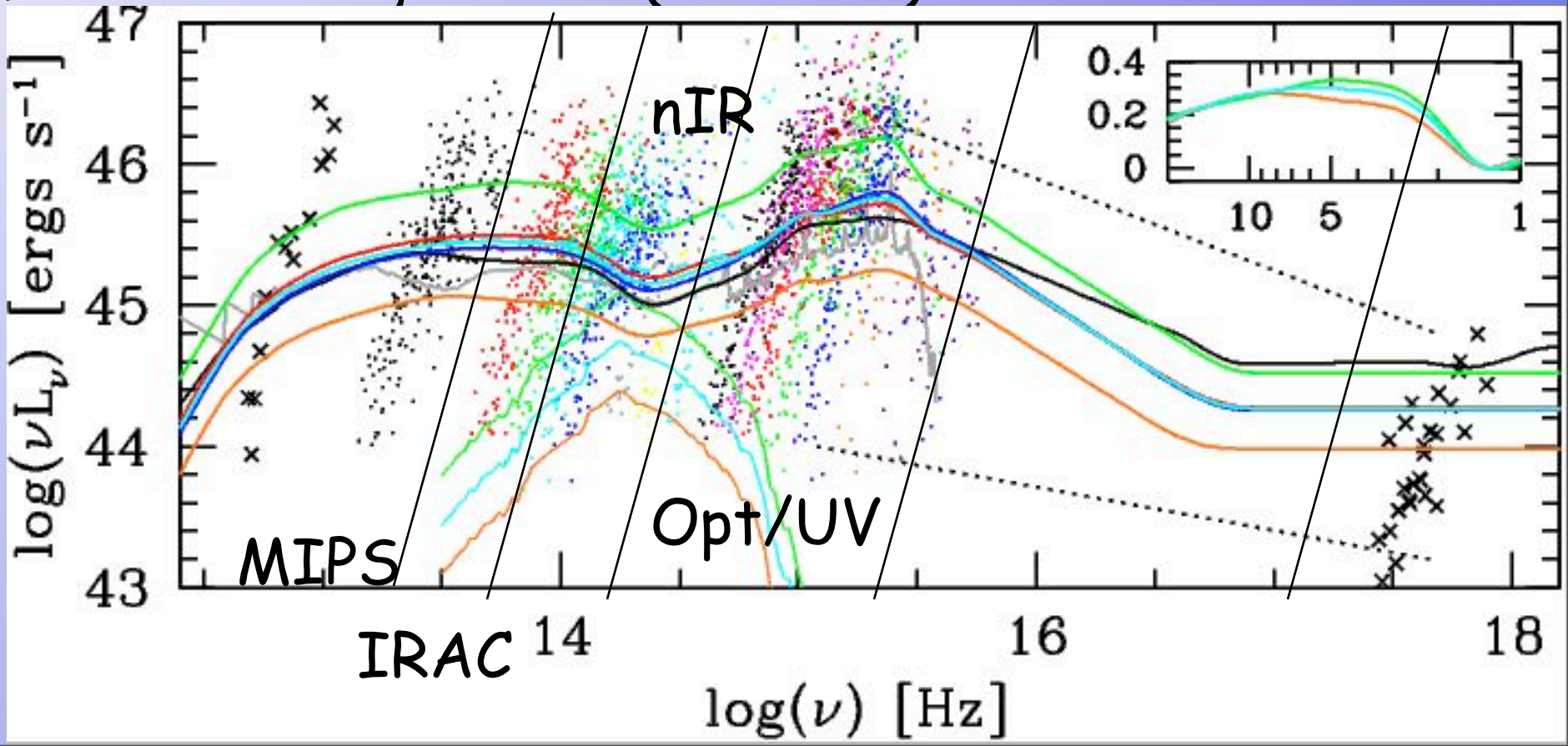
AGN

Previous work on getting a full QSO SED

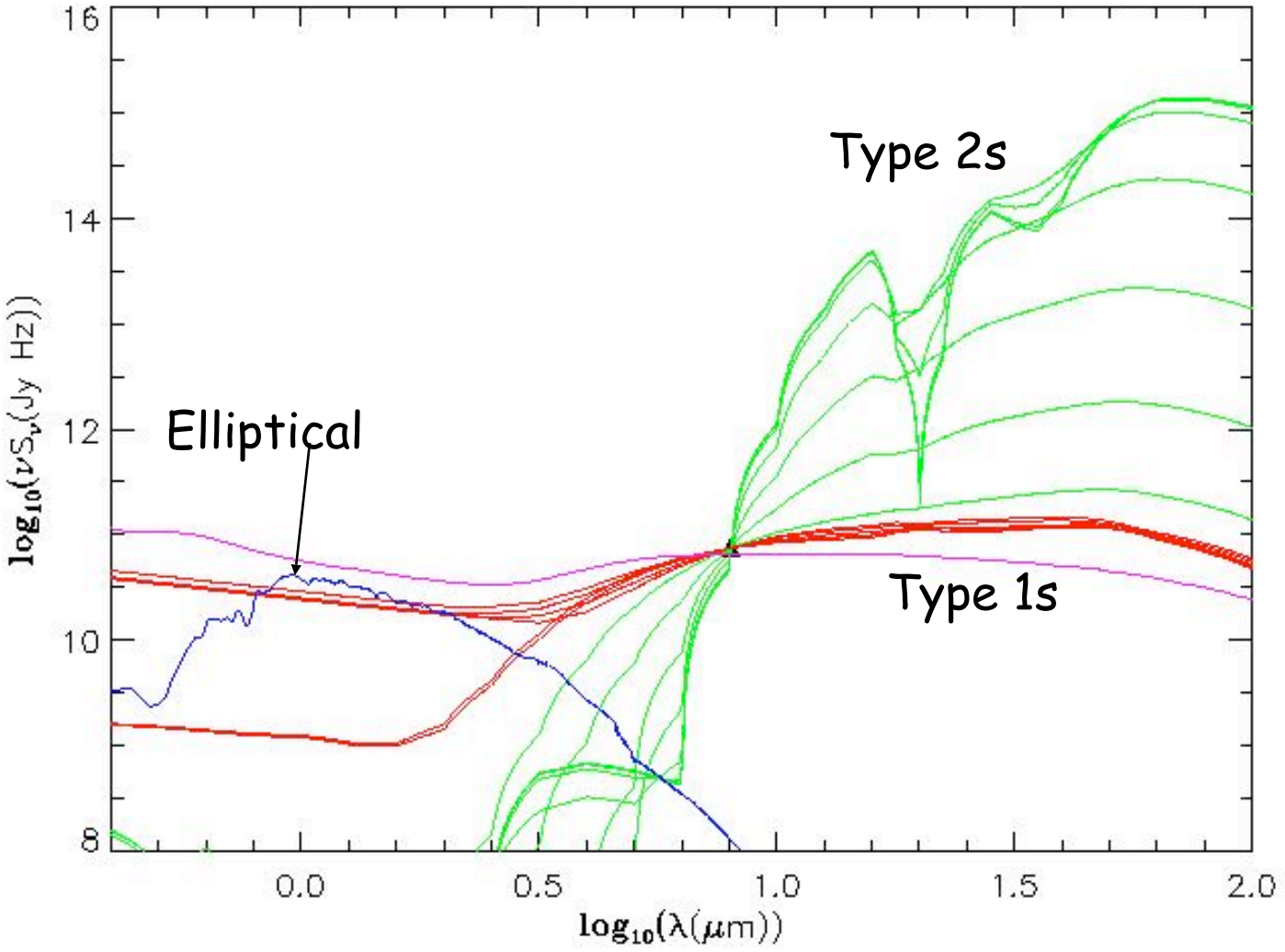
- For many years the best full-sed template for quasars came from Elvis et al. 1994.
- This was based on an X-ray selected sample of AGN from Einstein!!!
- Includes 29 RQQs and 18 RLQs.
- Dispersion of around 1dex for both IR and UV parts of the spectrum.
- This has been the benchmark for estimating the total bolometric luminosities of QSOs.

Previous work on getting a full QSO SED

Richards et al. (2006) published QSO SEDs from the SDSS which had overlap in other regions of sky with multi-wavelength data (0.1 <z< 5).



SEDs as a function of orientation



Based on Efstahiou & Rowan-Robinson 1995

Spitzer + Herschel – new windows on the Universe

MIPS 24um, 70um, 160um

IRAC 3.6, 4.5, 5.8, 8.0um

PACs: 60-85um or 85-130um + 130-210um

SPIRE 250, 350, 500um

Main science goals;

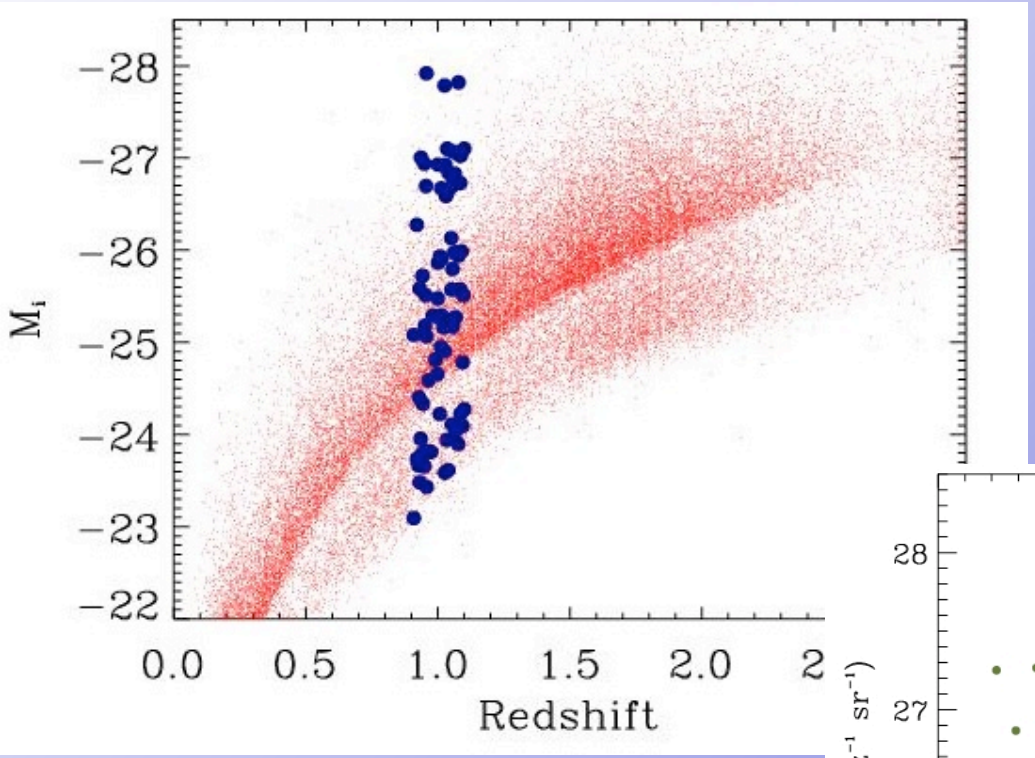
- Full dust sensitive SED of a range of AGN at high-z as a function of luminosity (and epoch in the future)
- Full SED as a function of orientation
- Full SED as a function of radio-loudness

(a) RQQs from SDSS at z=1

(b) RLQs from SDSS (same selection as (a))

(c) RGs matched in Lrad to the RLQs

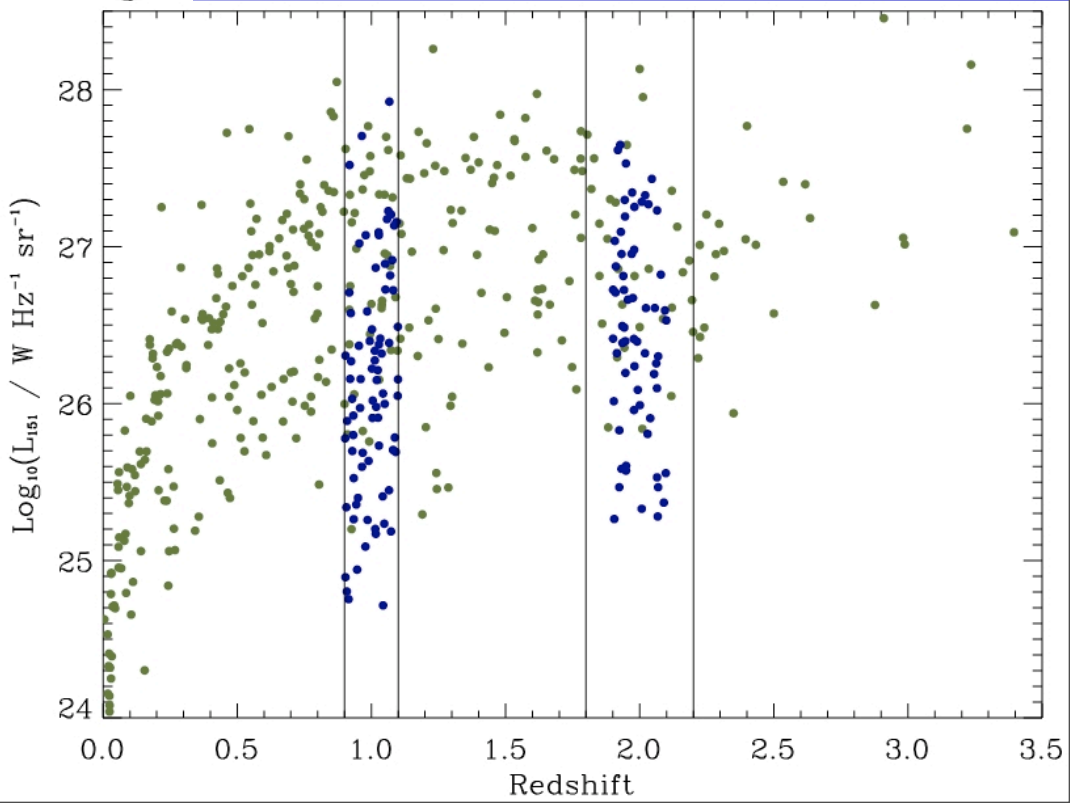
The samples



80 RLQs

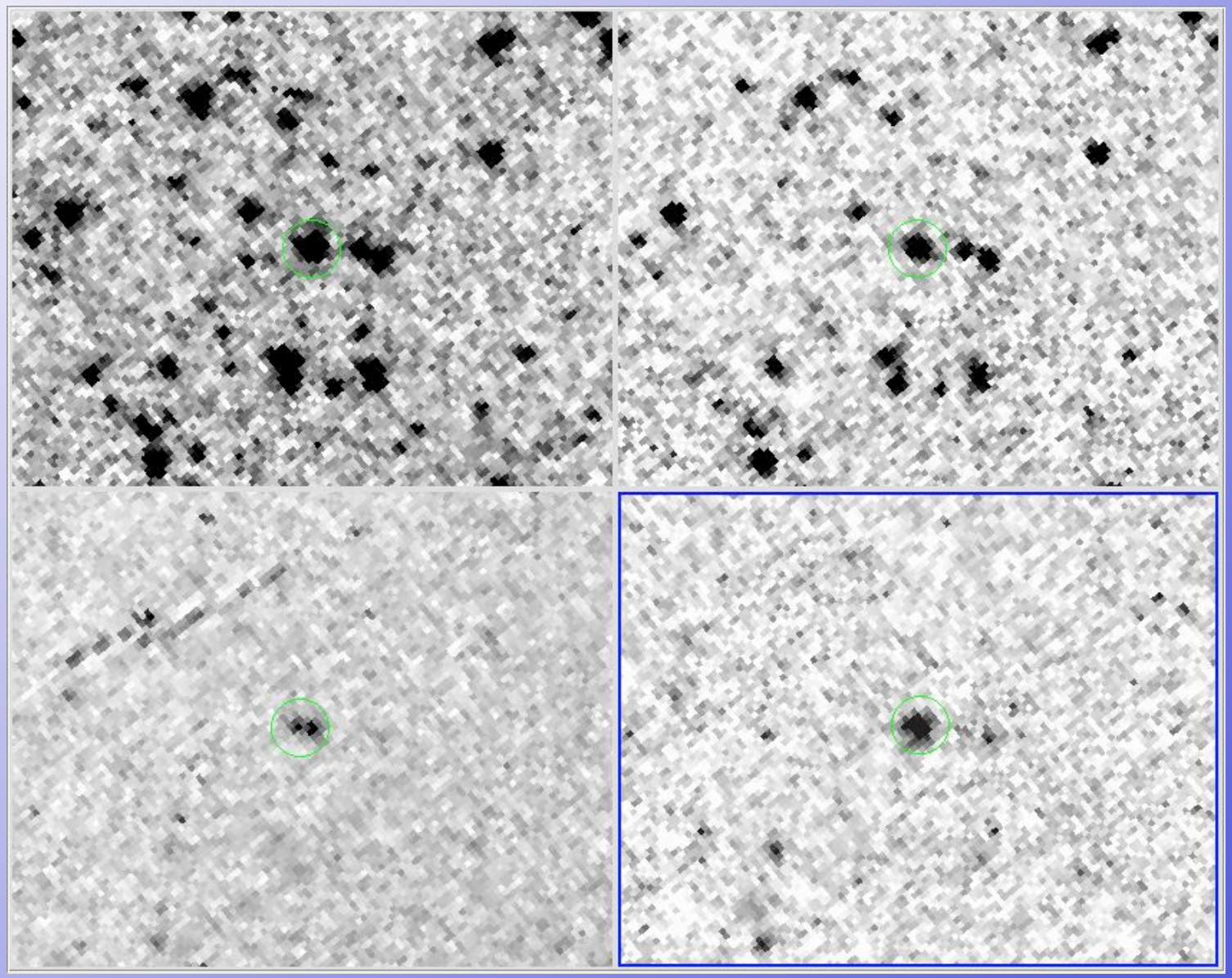
80 RQQs

27 RGs



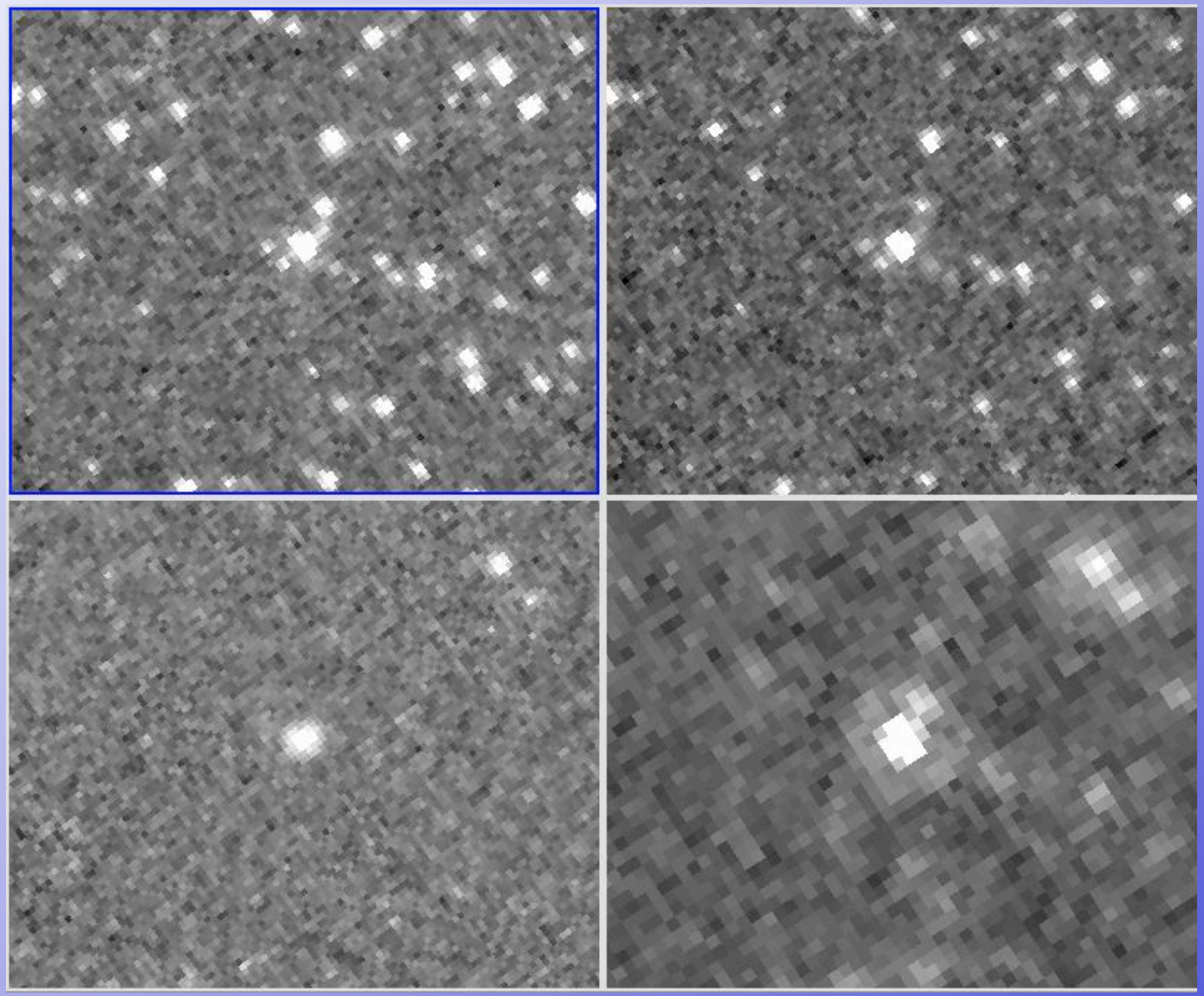
Some data

3C 343

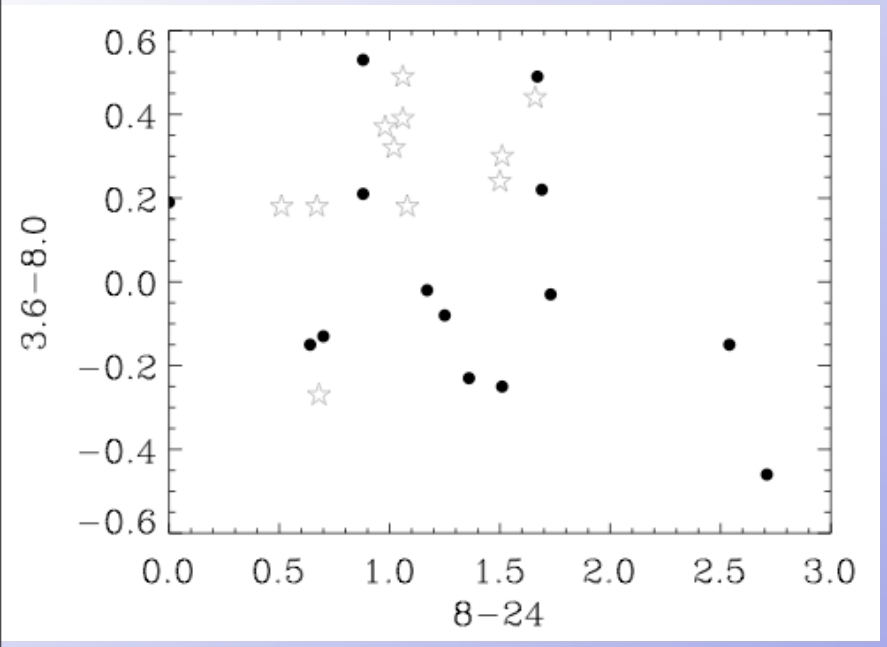


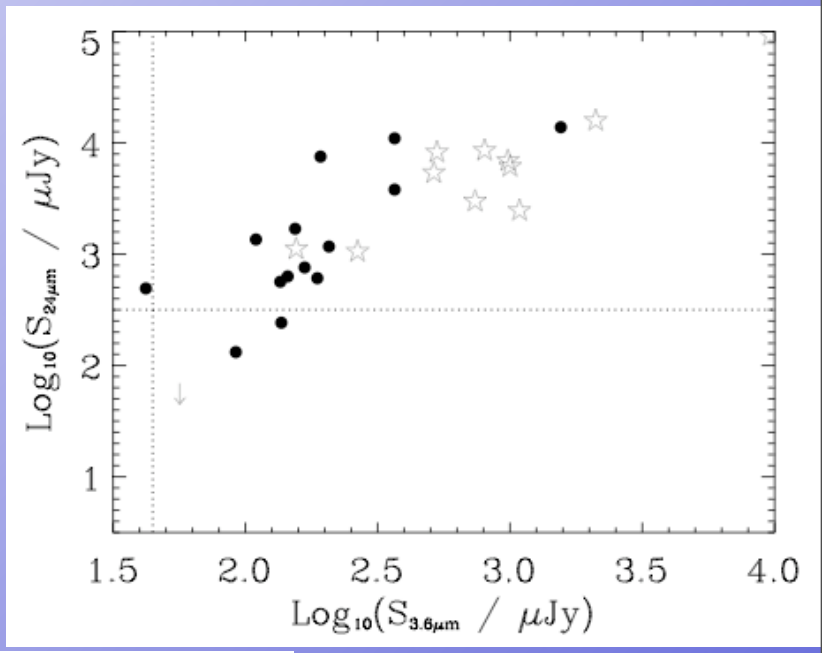
Some data

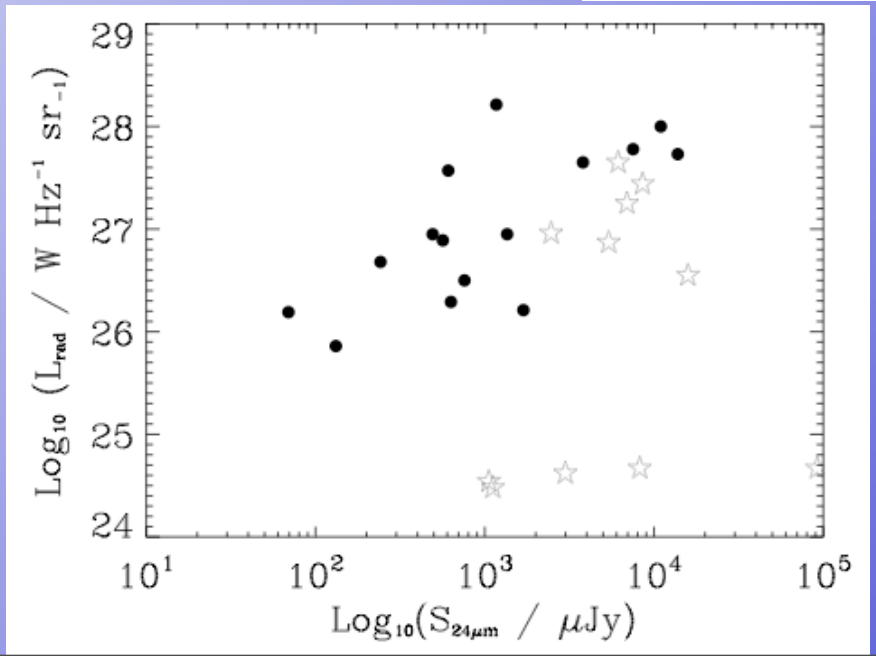
SDSS 1634



Some very preliminary results







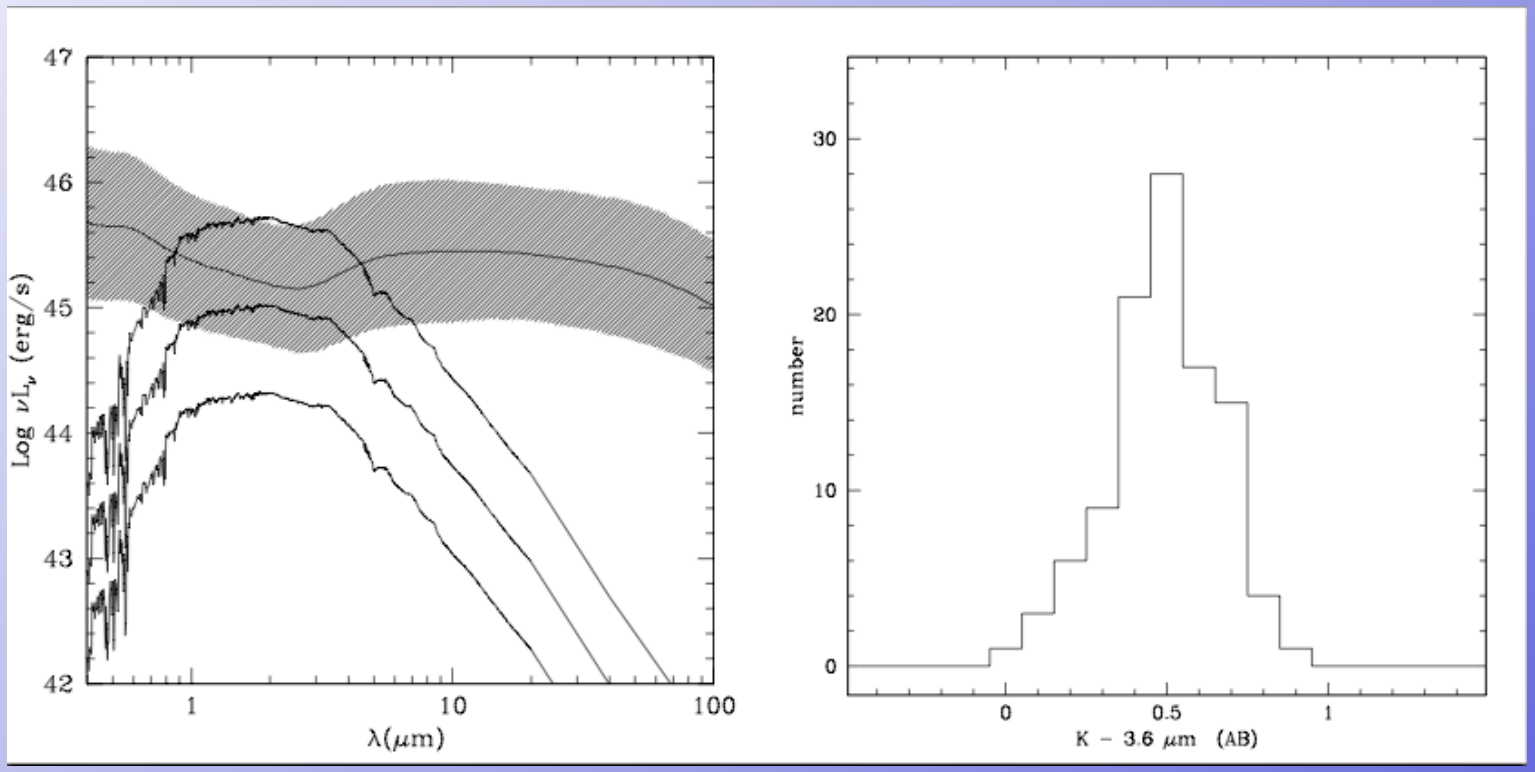
Follow-up observations

Obviously the Spitzer proposal was successful so we can now build on this to gain a full picture of AGN as a function of luminosity, orientation and radio loudness.

This was all in preparation for a Herschel Open Time Key Project. Herschel launches in 2008.

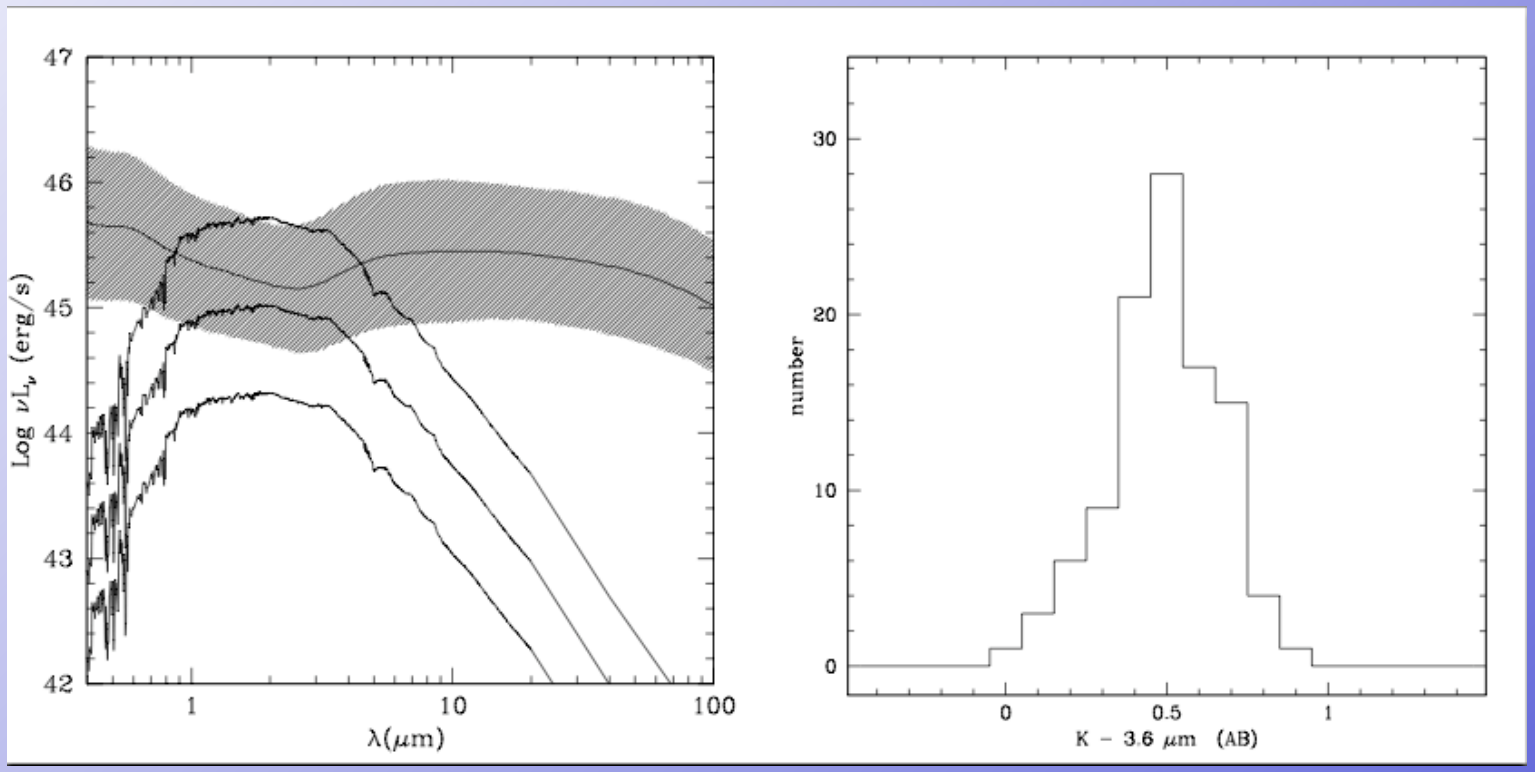
In the meantime…

Follow-up observations



Follow-up observations

- UKIRT to determine the host galaxy properties (PI McLure)



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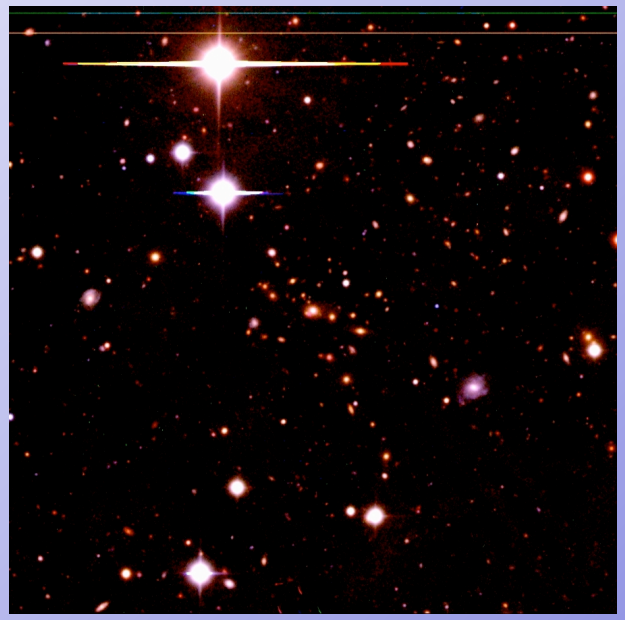


•XMM-Newton + SWIFT observations to pin down the UV and X-ray luminosities (PI Page)

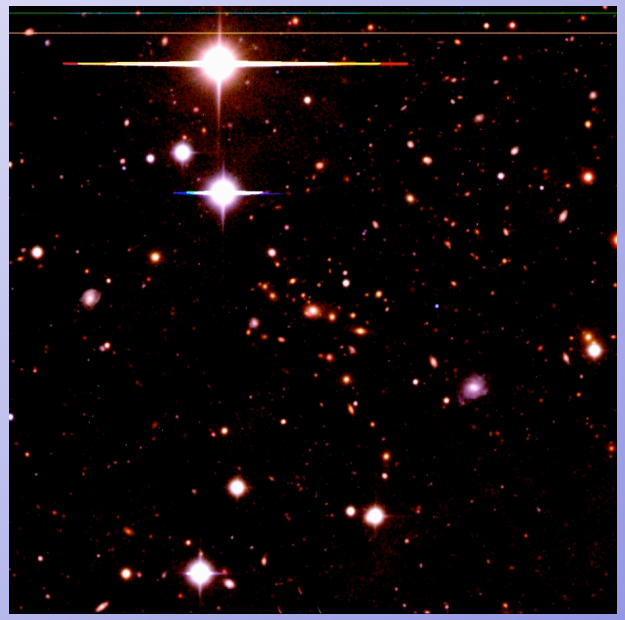
• MAMBO mm-photometry pilot study. (PI Omont)

Future…

• SCUBA2 submm photometry

Follow-up observations

•WHT Large Project to determine cluster environments (PI Jarvis & Perez-Fournon)



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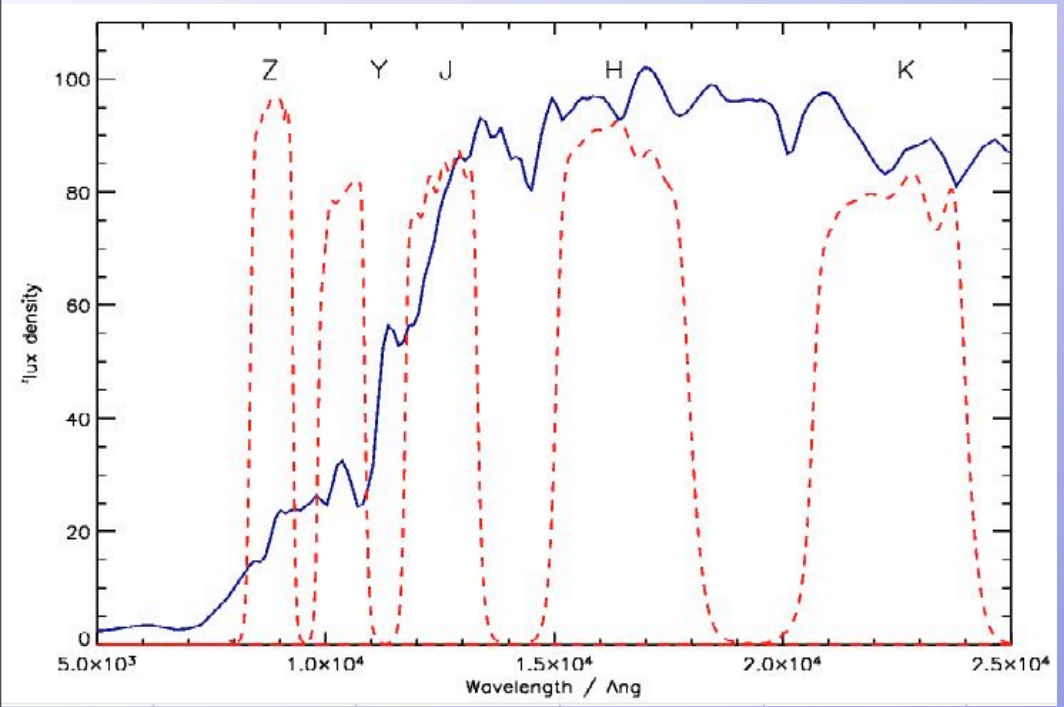
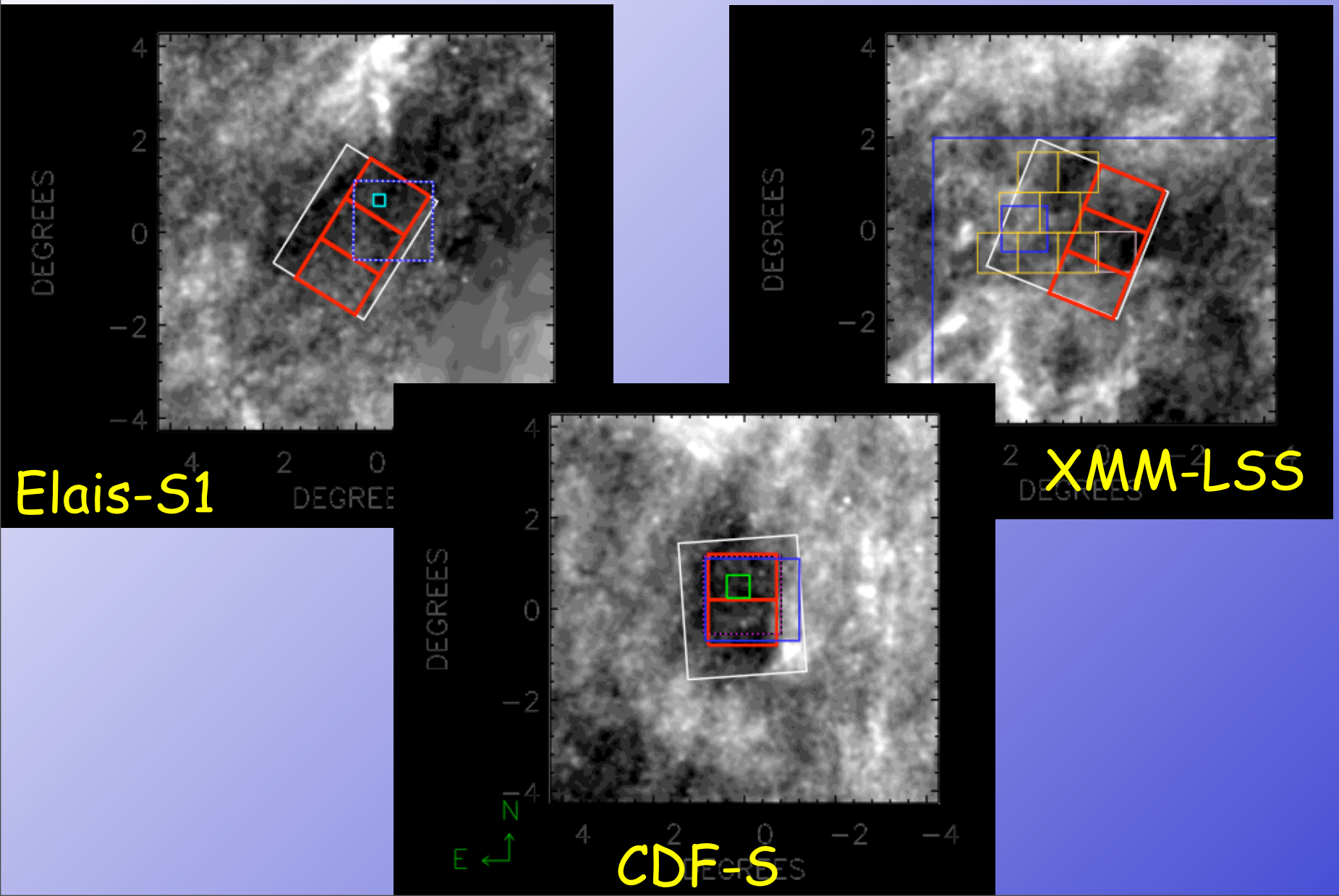
VIDEO Survey



- Clusters
- Clustering
- Galaxy evolution at 1<z<4
- High-z QSO LF

Filter	Time (h) (per source) (no overheads)	Time (h) (per tile) (+overheads)	Time (h) (full survey) (+overheads)	5σ AB	$2''$ ap.mag. Vega	UKIDSS Vega	Seeing	Moon	Transparency
Z	17.5	60.8	570	25.7	25.2	–	0.8	D	THN,CLR
Y	6.7	23.2	218	24.6	24.0	–	0.8	G	THN,CLR
J	8.0	27.9	261	24.5	23.7	22.3	0.8	G	THN,CLR
H	8.0	29.4	276	24.0	22.7	22†	0.8	B	THN,CLR
K_s	6.7	23.8	224	23.5	21.7	20.8	0.6	B	THN,CLR

VIDEO Survey



Summary

- Aim is to obtain the full SED as a function of Lbol at cosmologically important z

- We now have 95% of the Spitzer data (the rest is scheduled for this month)

- Will be submitted as a Herschel OTKP in Oct

- Other observations also underway to obtain host galaxy properties, cluster environments etc, as well as nuclear properties

- Will be key in interpreting the survey data