



The nature of faint radio sources: insights from a panchromatic approach

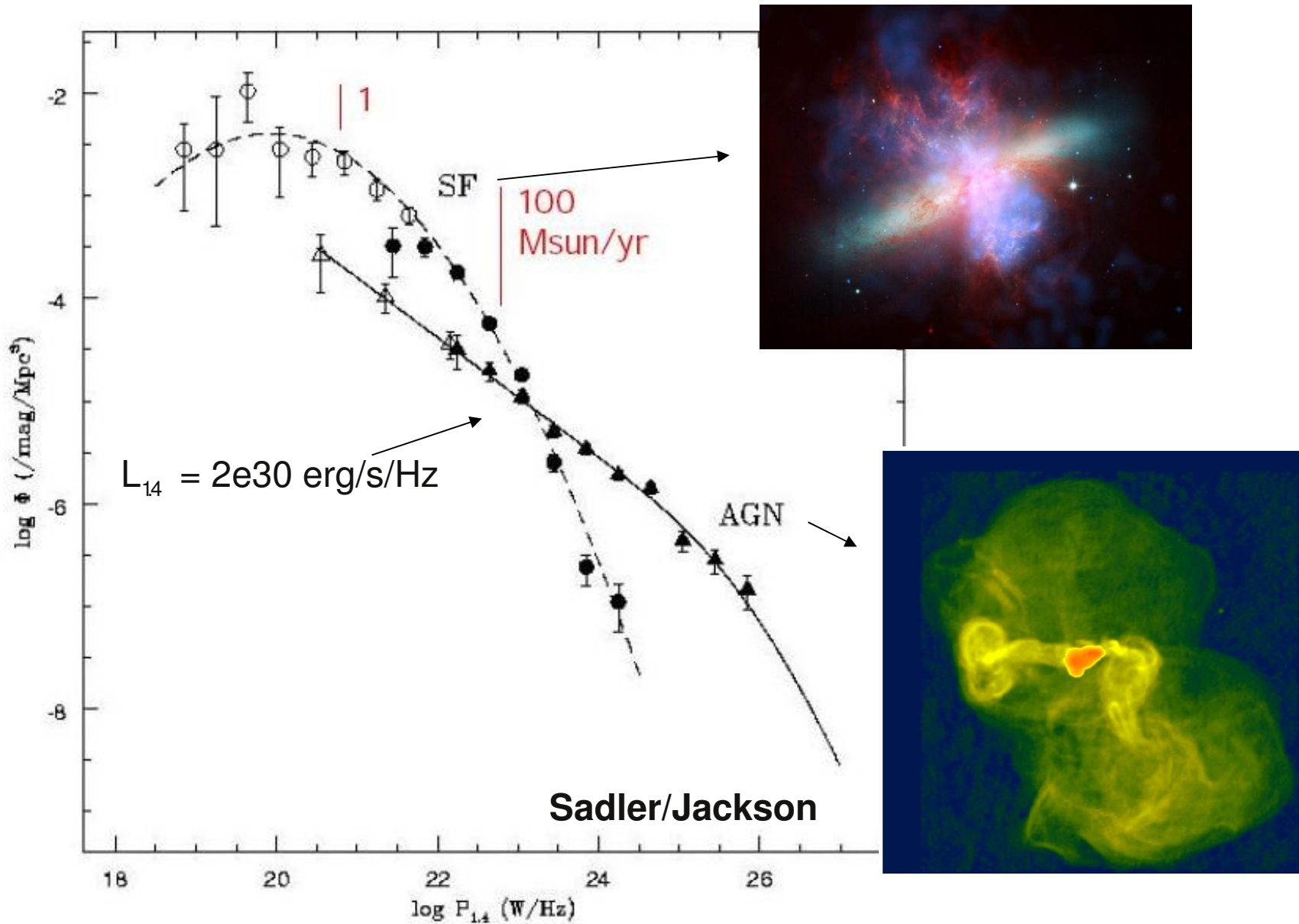
Maurilio Pannella

with

Veronica Strazzullo and Frazer N. Owen

Faint radio populations

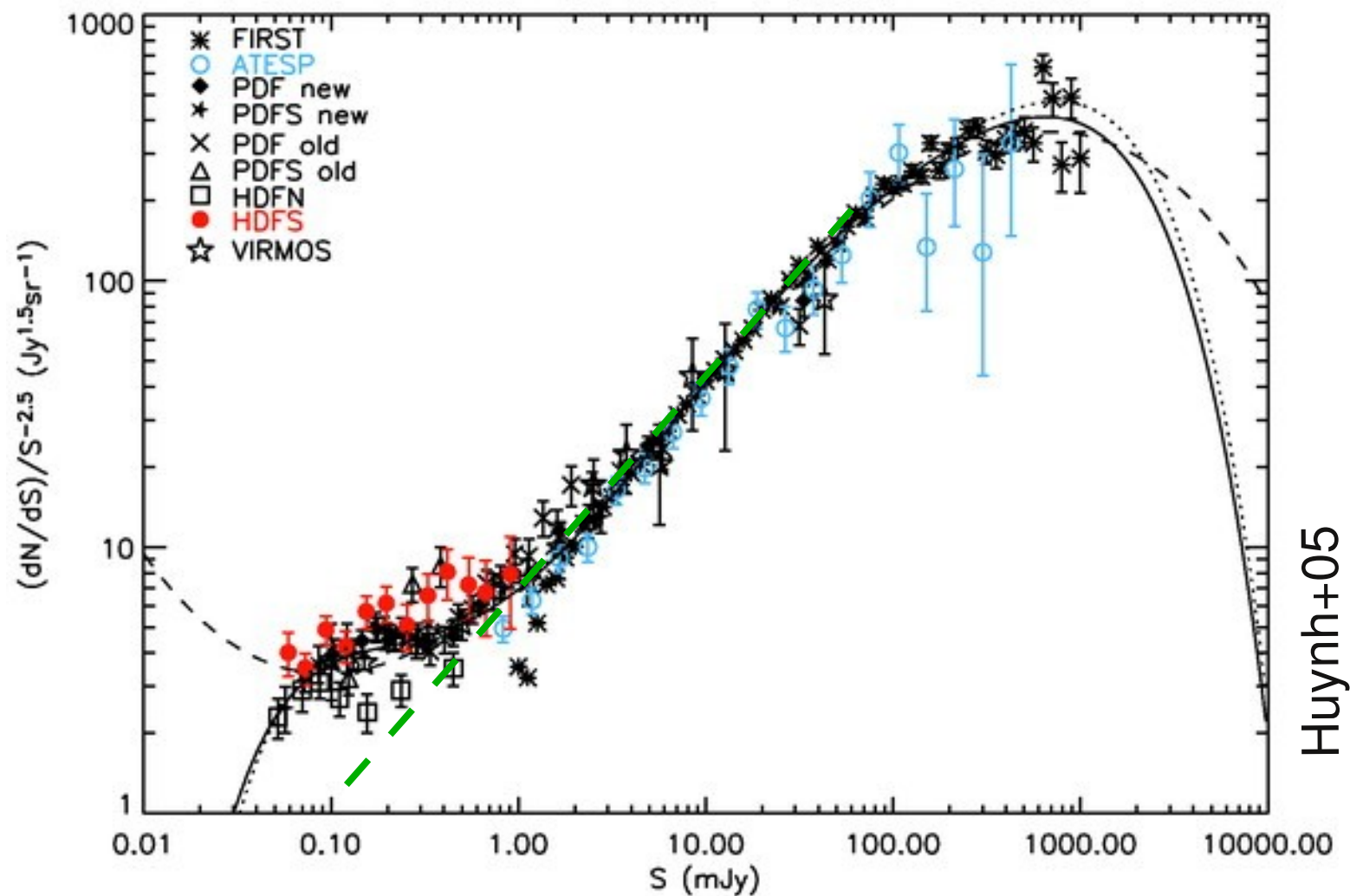
The nature of radio sources at low z : AGN and star-burst



Faint radio populations

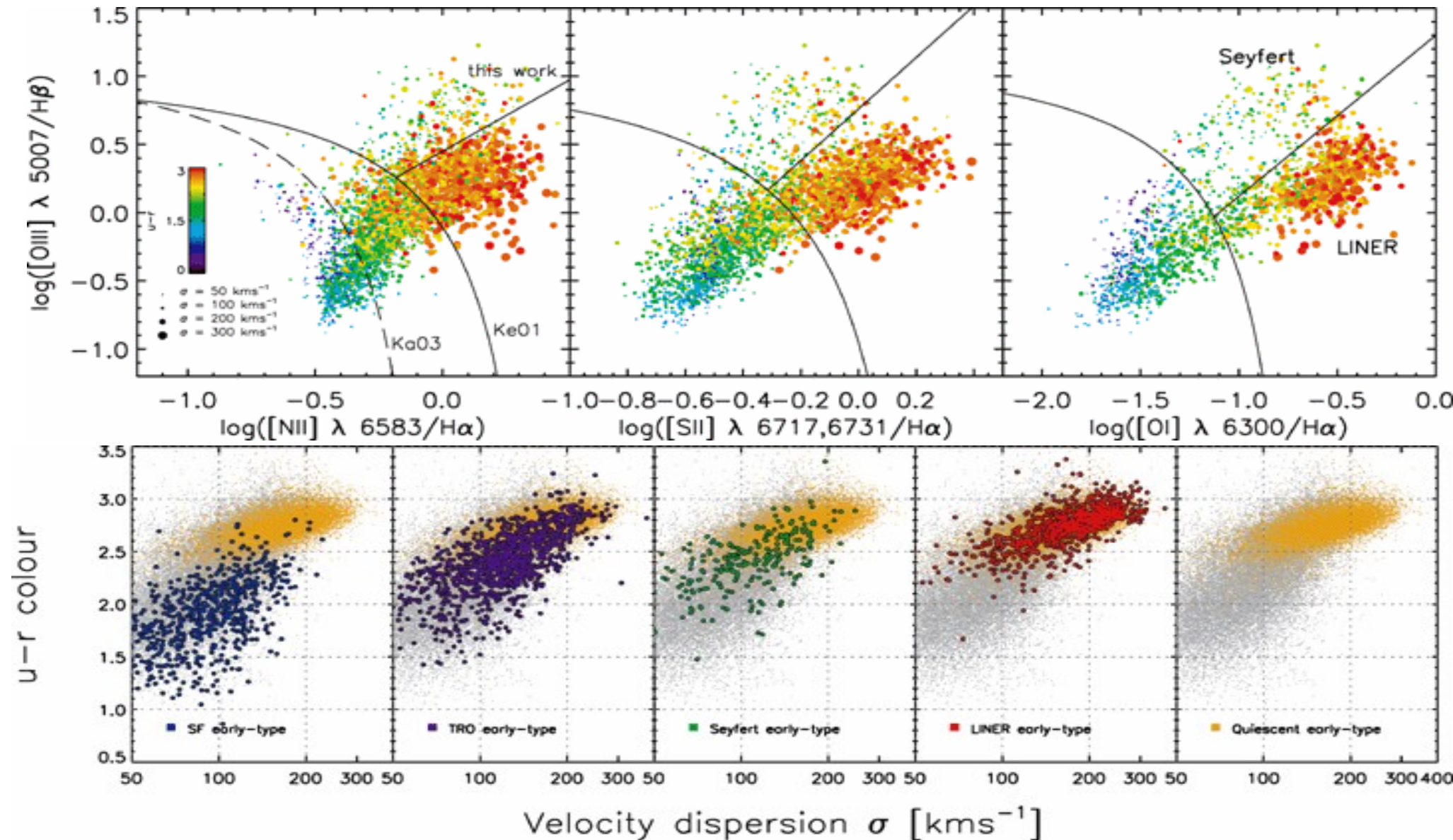


The nature of radio sources at low z : AGN and star-burst



AGN, star-burst and transition objects

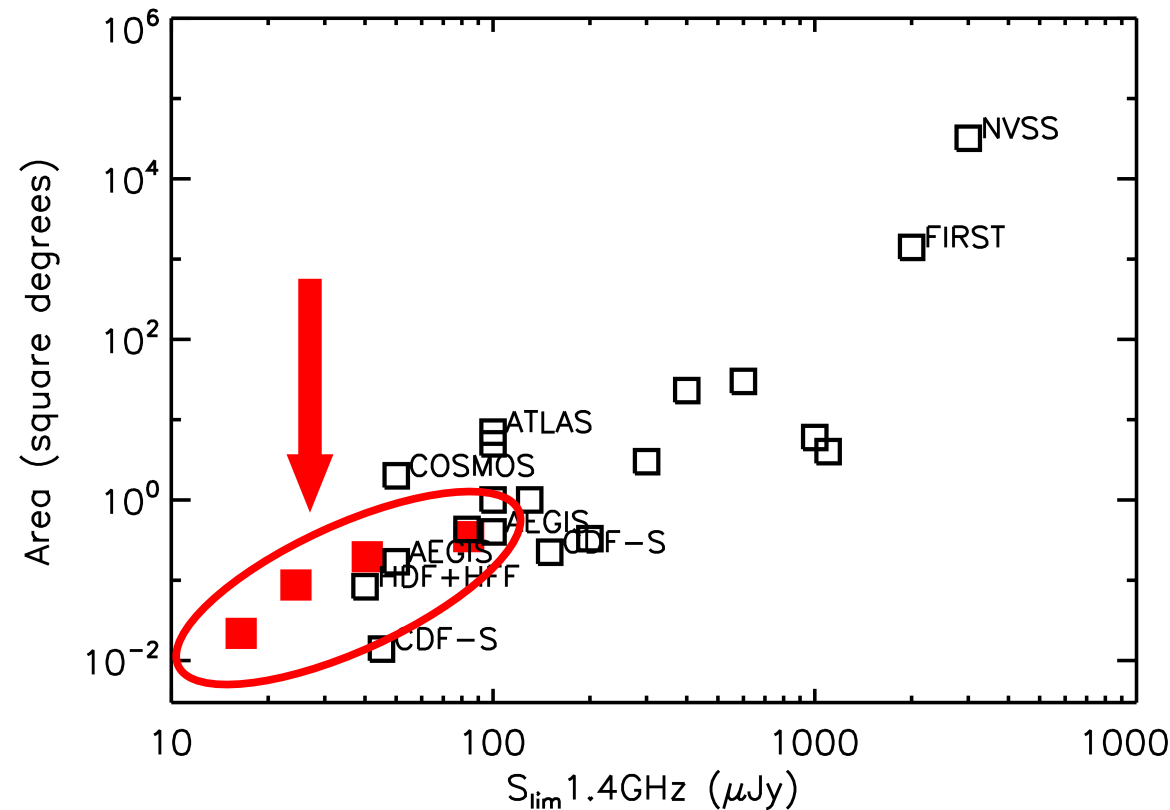
The AGN feedback on the evolution of the host galaxy:
the build up of the red and dead galaxy population



The VLA SWIRE Deep Field



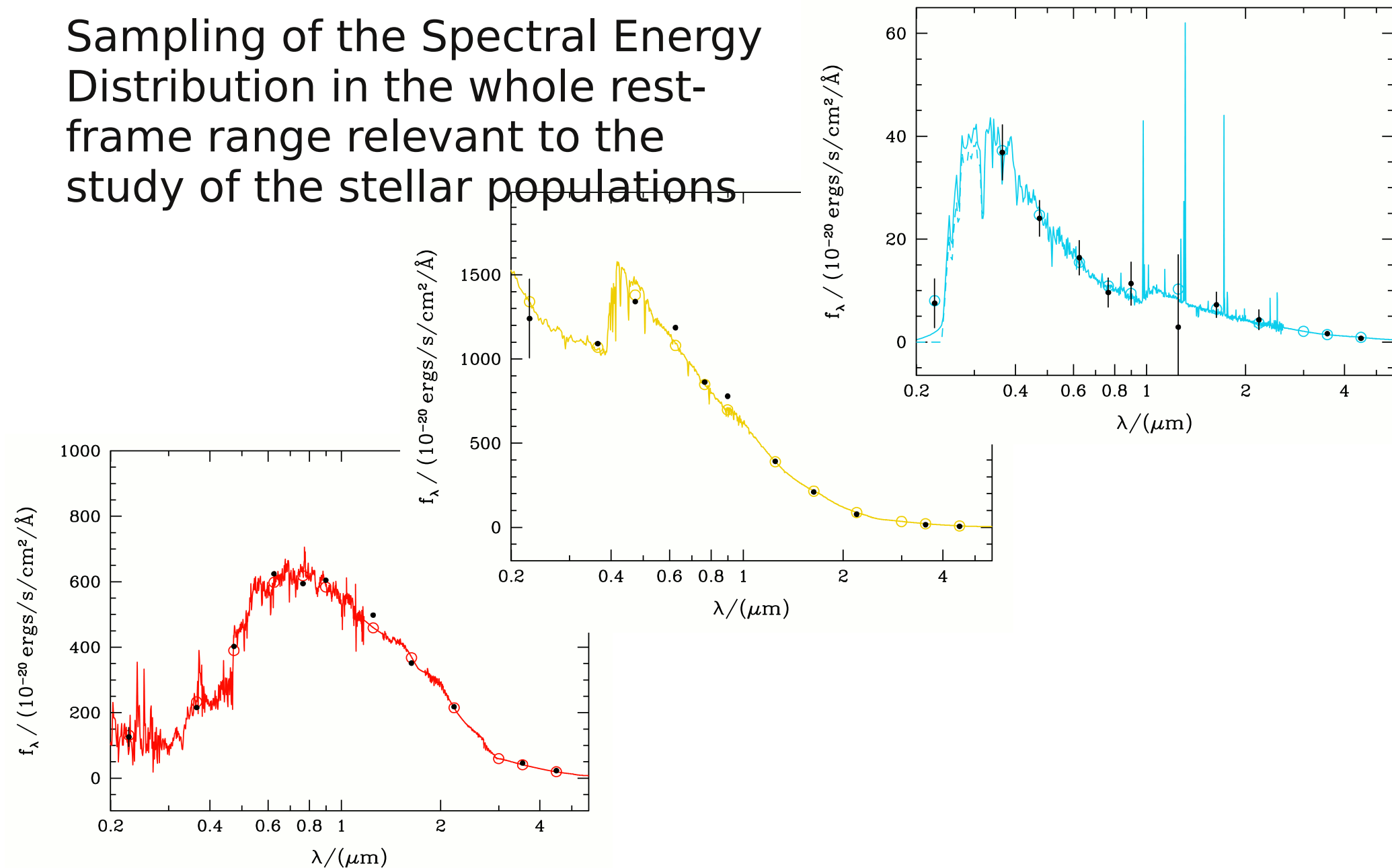
- a deep 20cm-selected sample
 - rms at image center $\sim 2.7 \mu\text{Jy}$
 - 1.6" resolution
- 0.6 x 0.6 square degrees
- 490 spectroscopic redshifts
- extensive multi-wavelength photometry:
X-ray, FUV, NUV, U, g, r, i, z, J, H, K, IRAC (3.6, 4.5, 5.8, 8 μm),
MIPS(24, 70, 160 μm), radio (20cm, 50cm, 90cm)



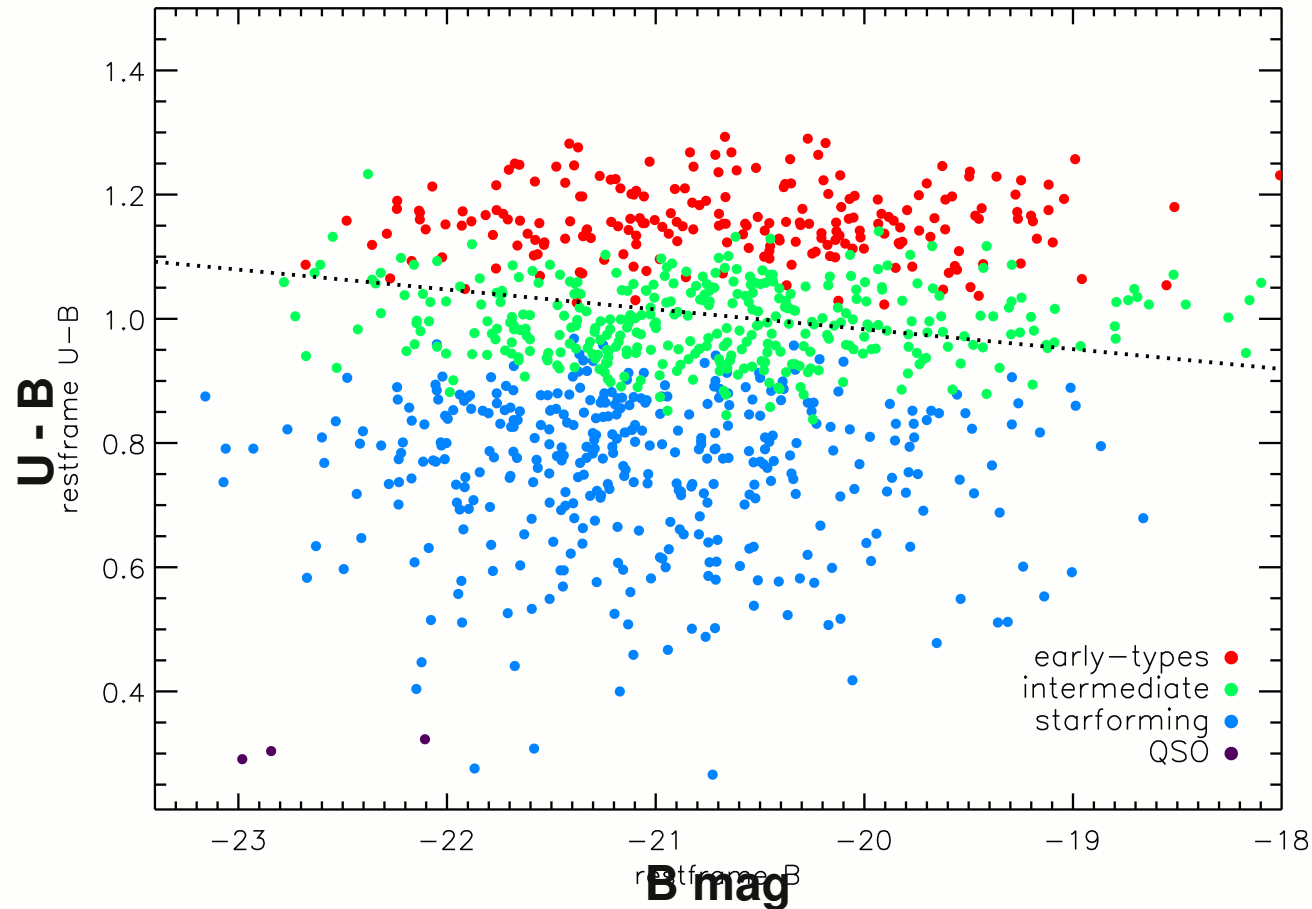
The VLA SWIRE Deep Field



Sampling of the Spectral Energy Distribution in the whole rest-frame range relevant to the study of the stellar populations

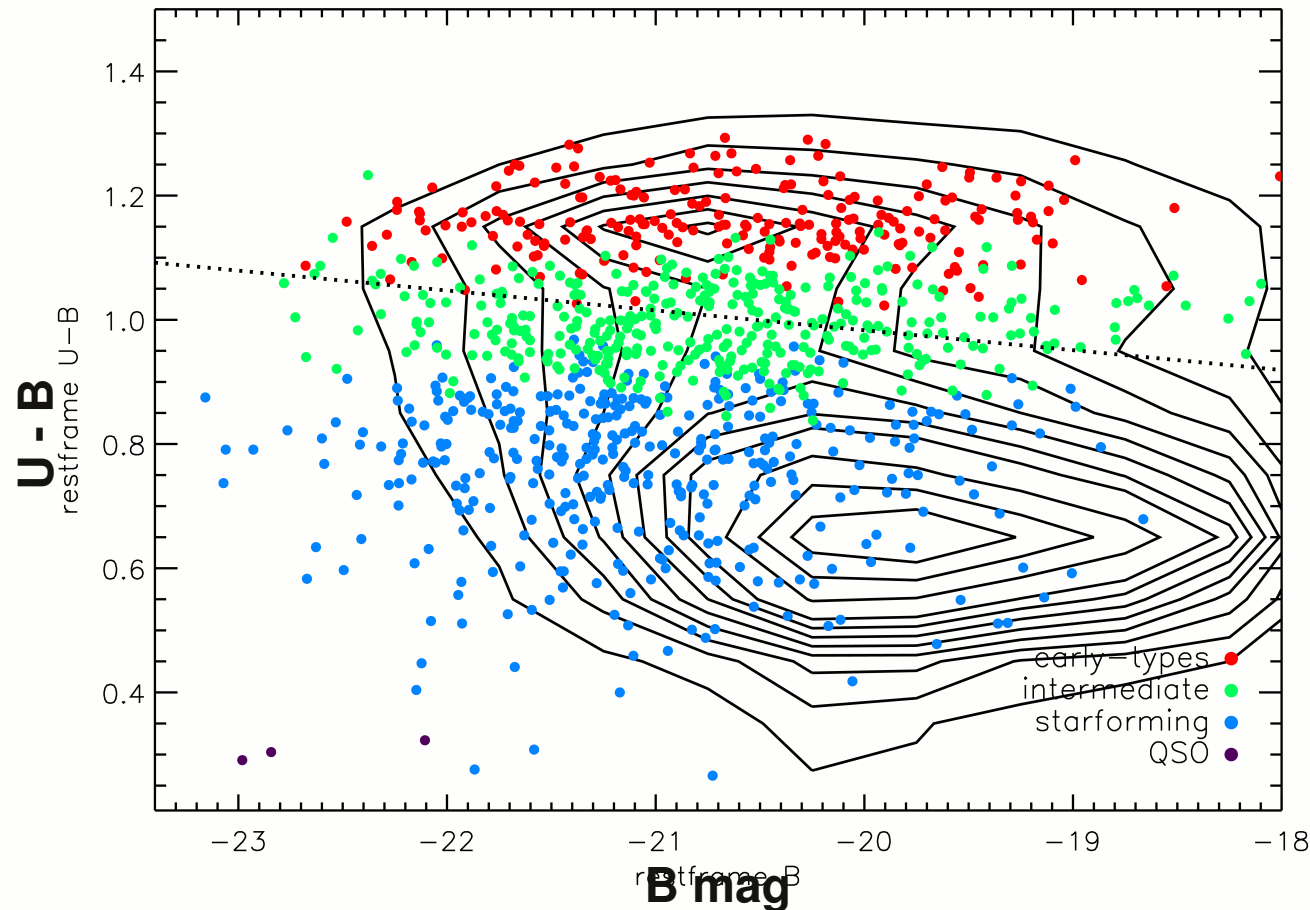


Color-magnitude of the host galaxies



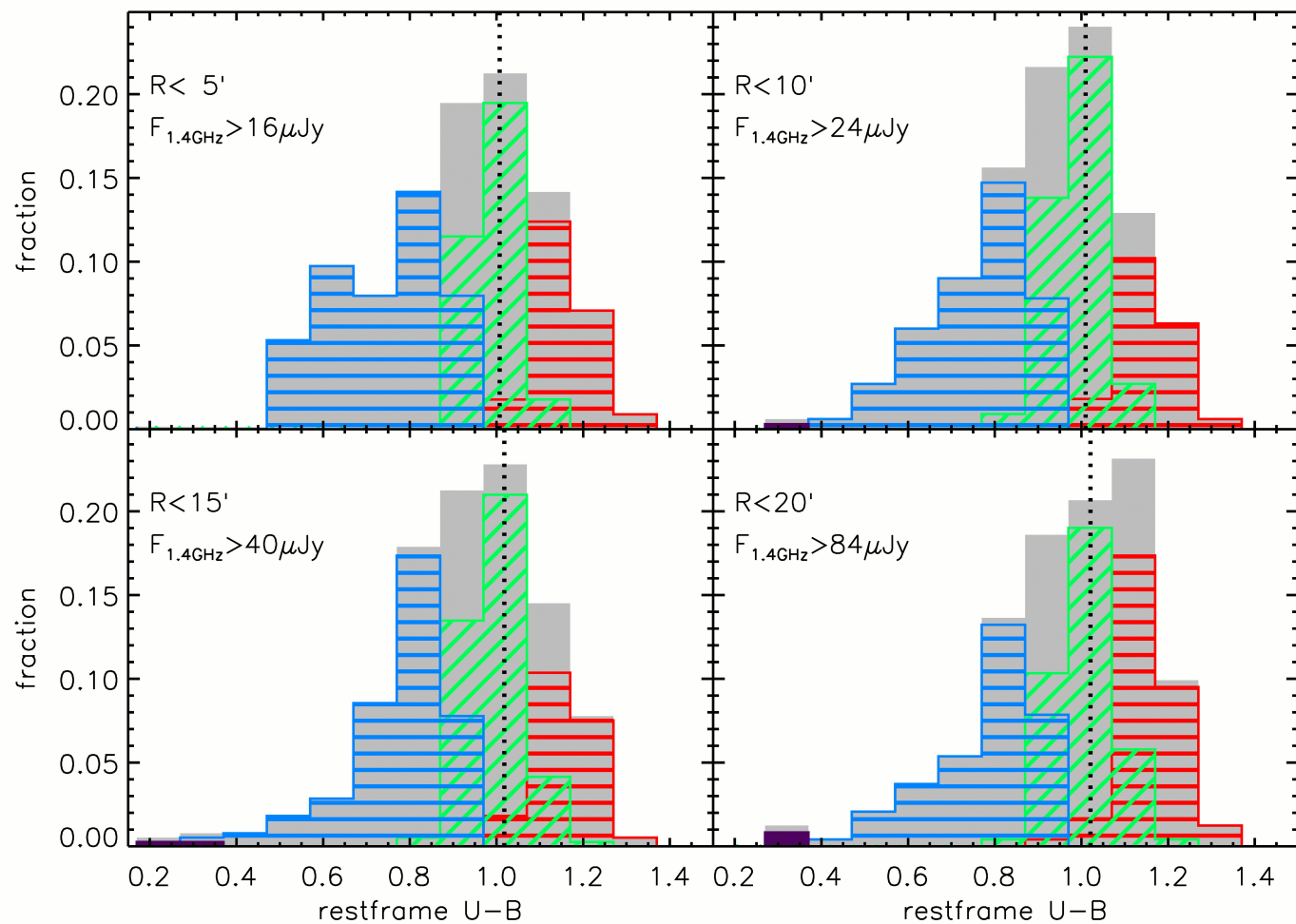
- all sources at $0.3 < z < 1.3$ (i.e. not a flux limited sample)
- early-types in red sequence, star-forming galaxies in blue cloud

Color-magnitude of the host galaxies

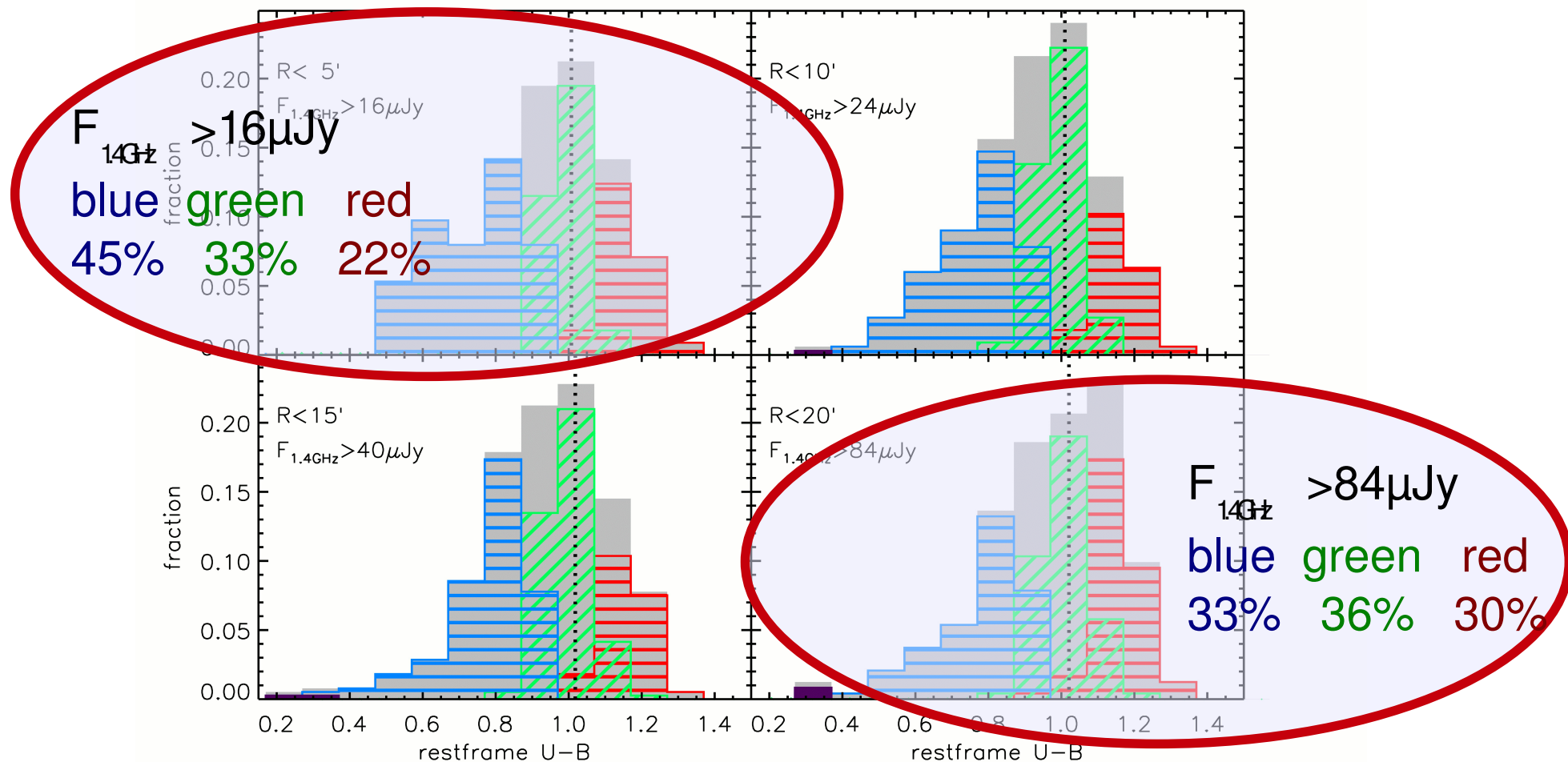


- all sources at $0.3 < z < 1.3$ (i.e. not a flux limited sample)
- early-types in red sequence, star-forming galaxies in blue cloud
- high density of intermediate “green valley” galaxies

The mix of host galaxies



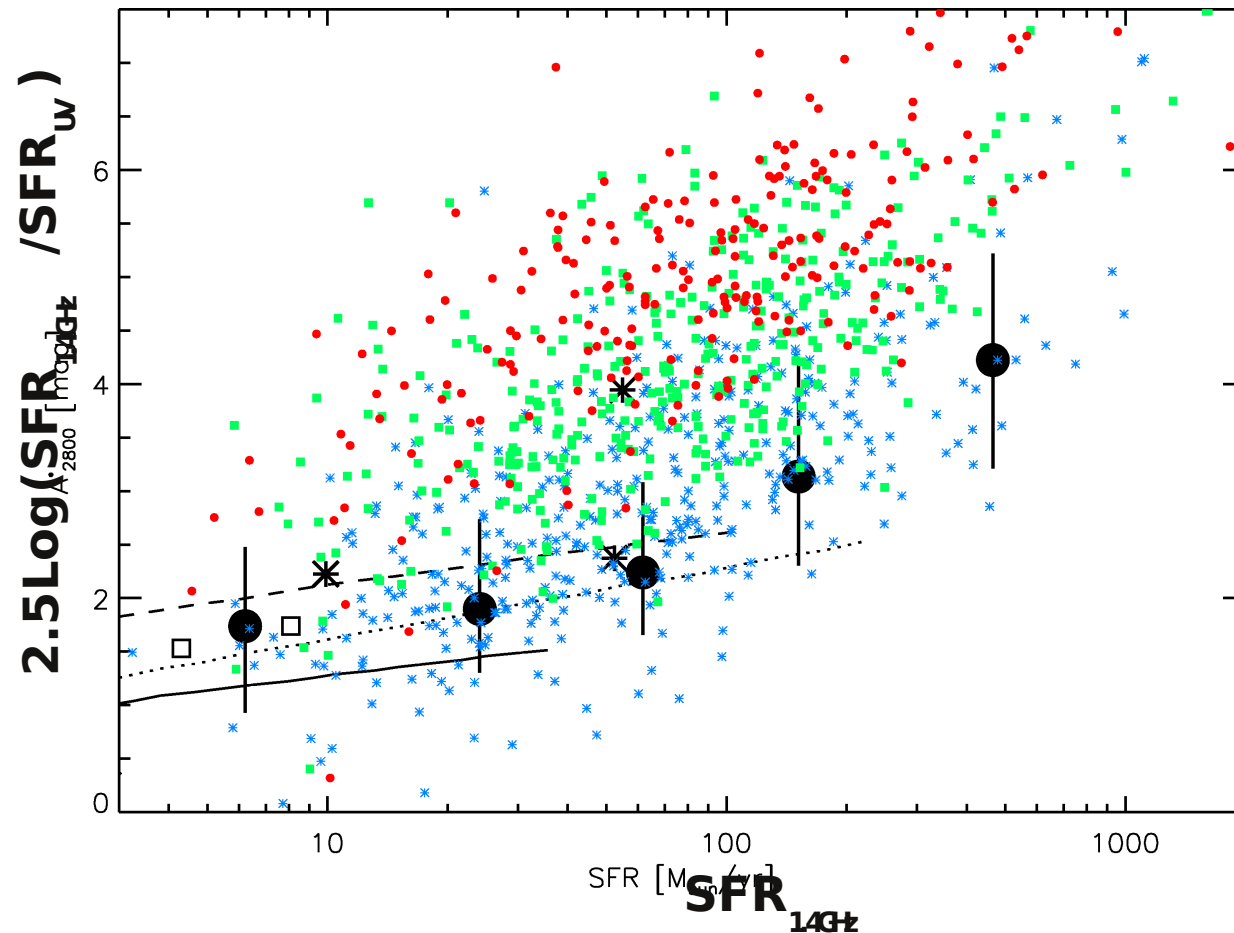
The mix of host galaxies



The nature of hosts galaxies



Testing the amount of dust attenuation suffered by the UV light



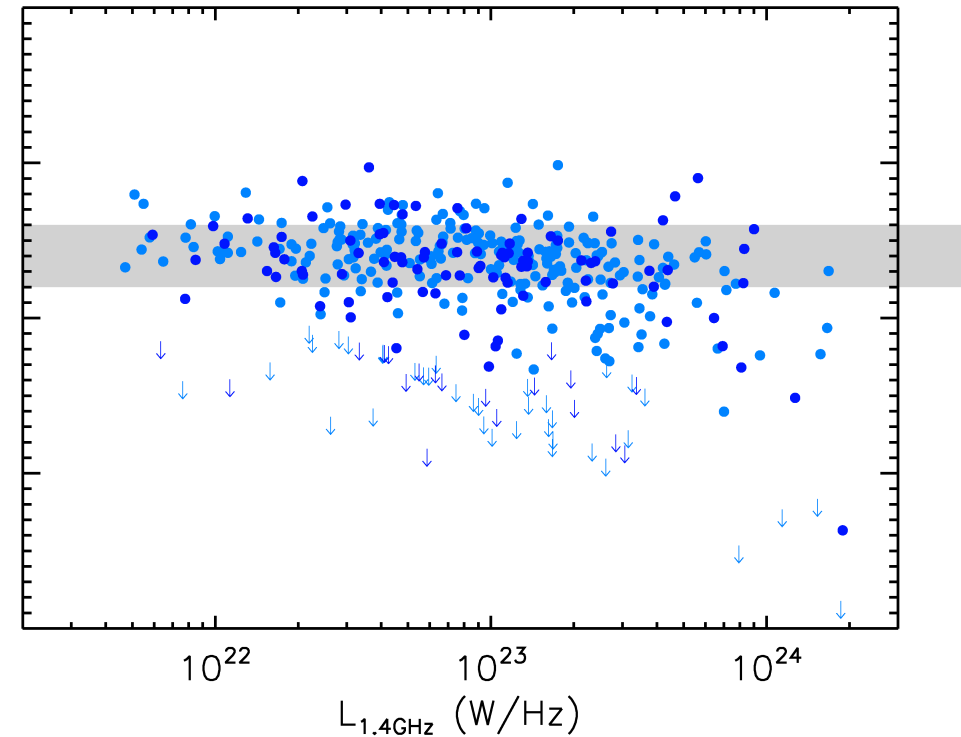
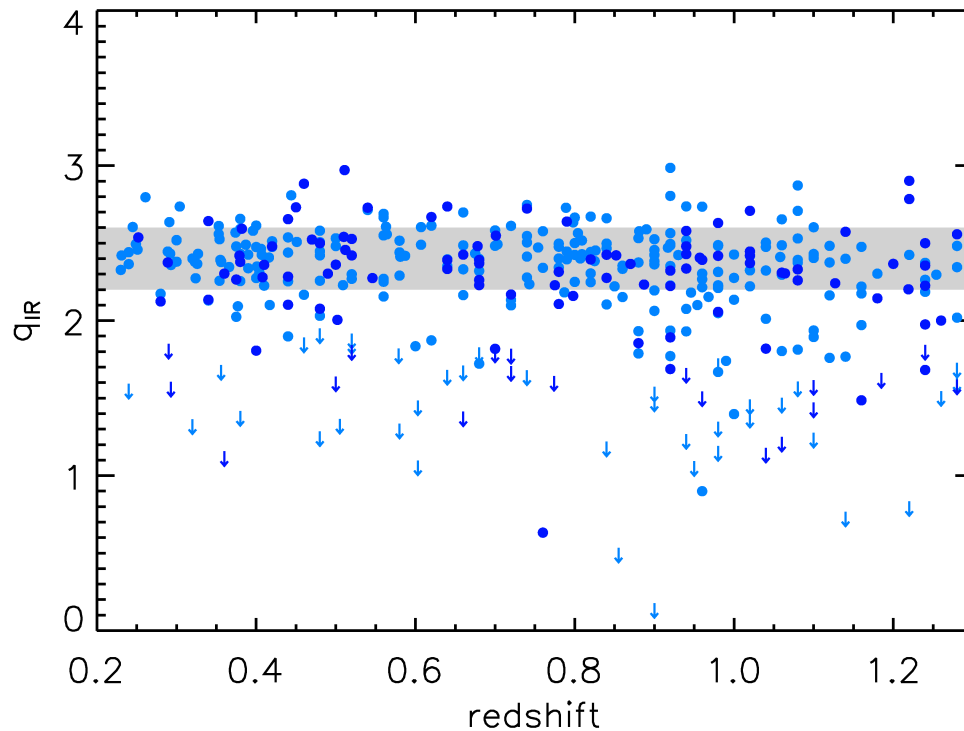
Attenuation data:
Calzetti+ 2000
Calzetti 2001
Hopkins+ 2001
Afonso+ 2003
Choi+ 2006
Pannella+ 2009

- blue galaxies in agreement with other star-forming samples
- red and green galaxies have too high radio/UV flux ratios

The nature of hosts galaxies



Testing the radio/IR correlation for the different SED types

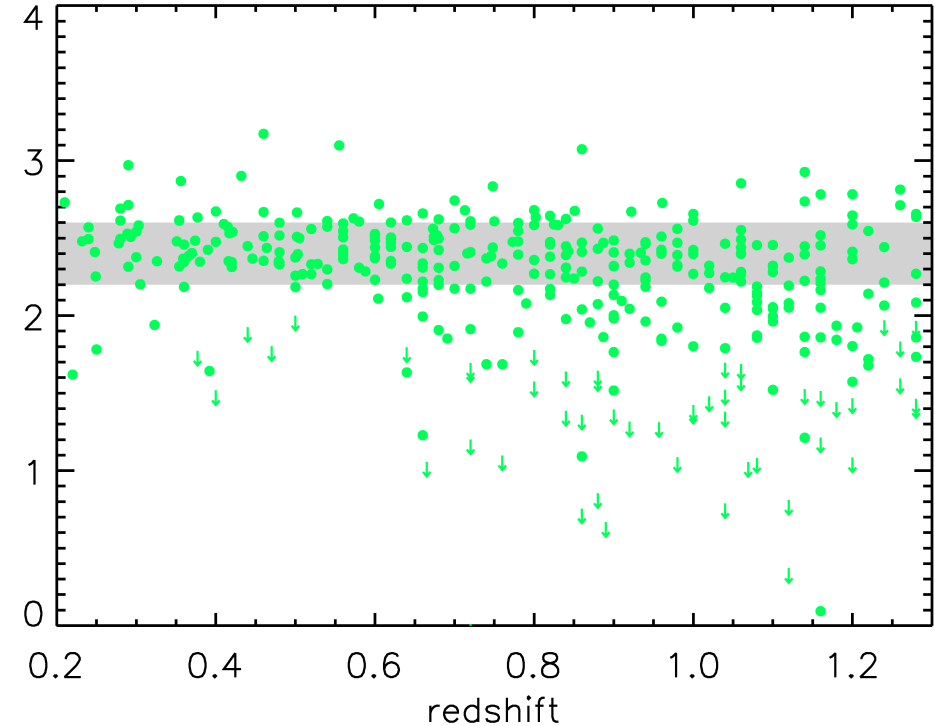
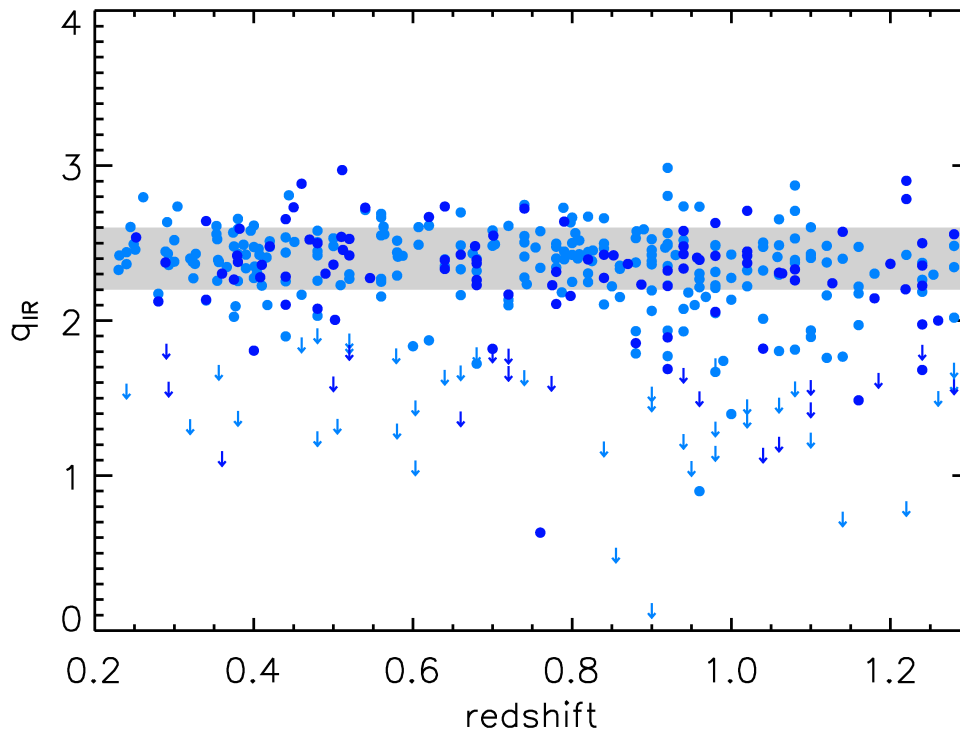


- $q_{\text{IR}} \sim 2.4$ (e.g. Ivison+09)
- mild/no evolution as a function of redshift and radio luminosity

The nature of hosts galaxies



Testing the radio/IR correlation for the different SED types

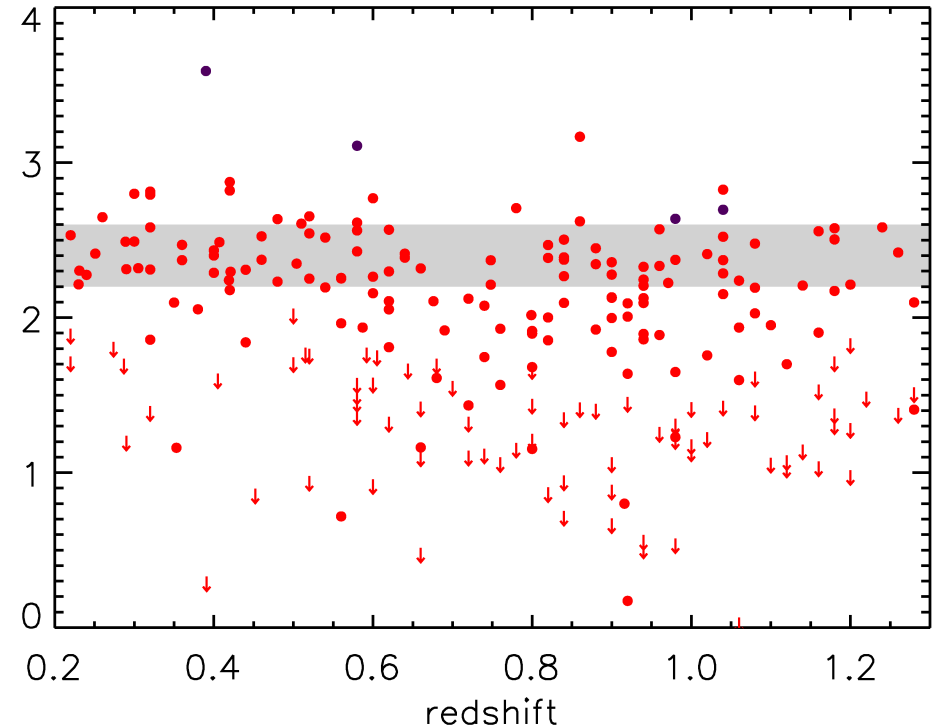
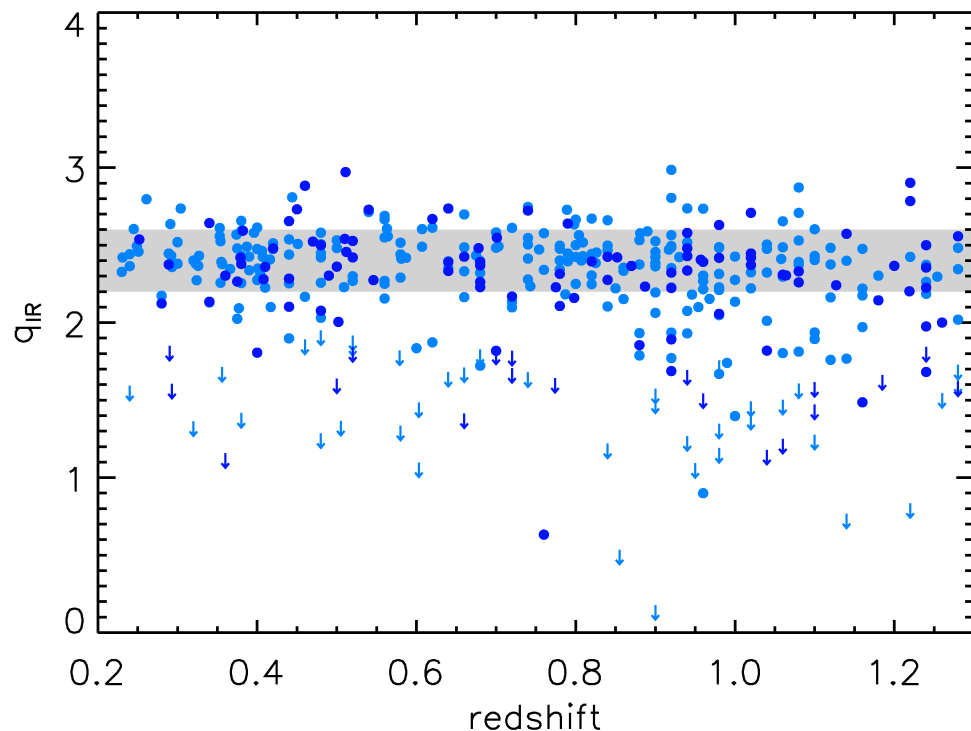


- green valley objects behave similarly to star-forming galaxies

The nature of hosts galaxies



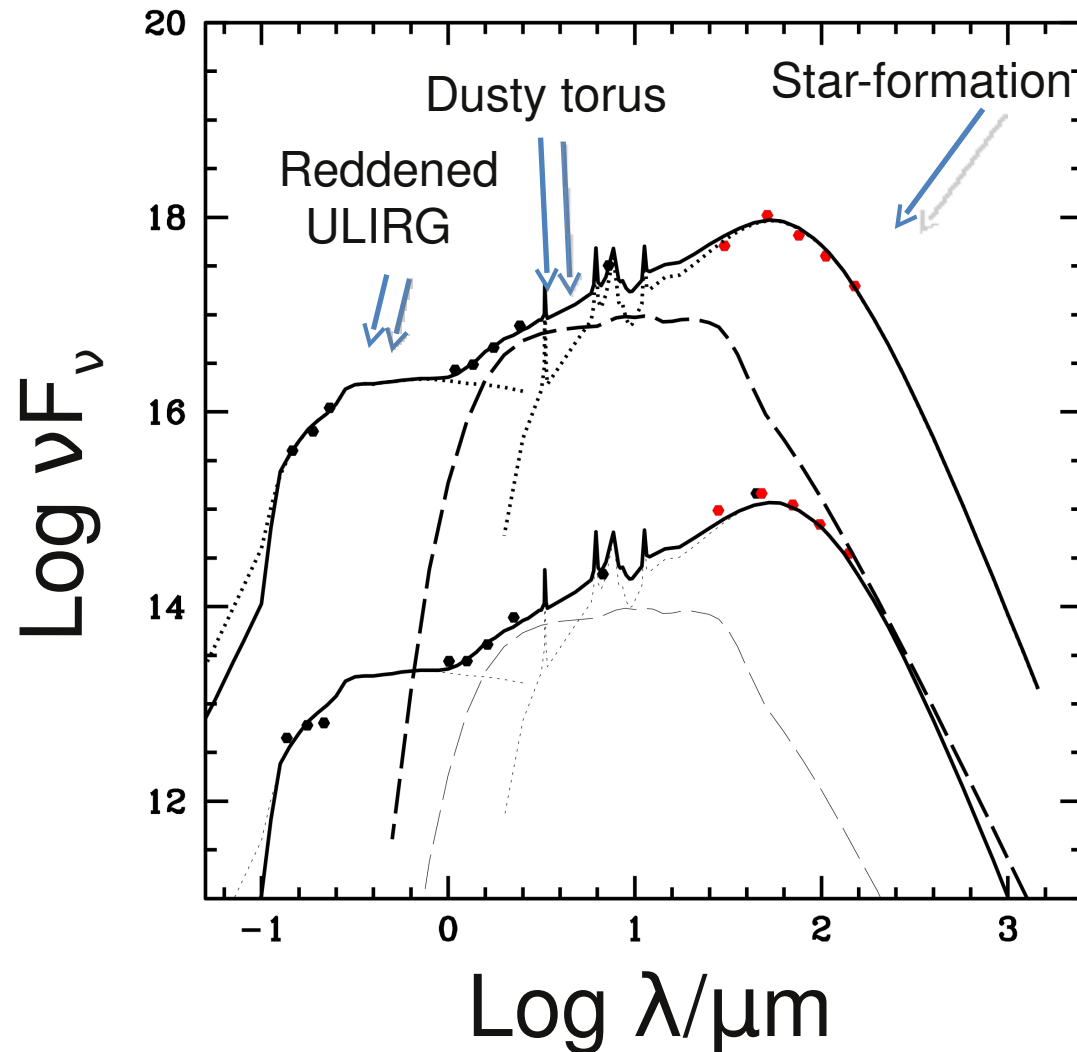
Testing the radio/IR correlation for the different SED types



- more than 30% of the red (and dead ?) galaxies have $q_{\text{IR}} \sim 2.4$
- are they starbursts or is there a wild conspiracy going on ?
(see e.g. Obrid+06, Smolcic+08, Sargent+10)

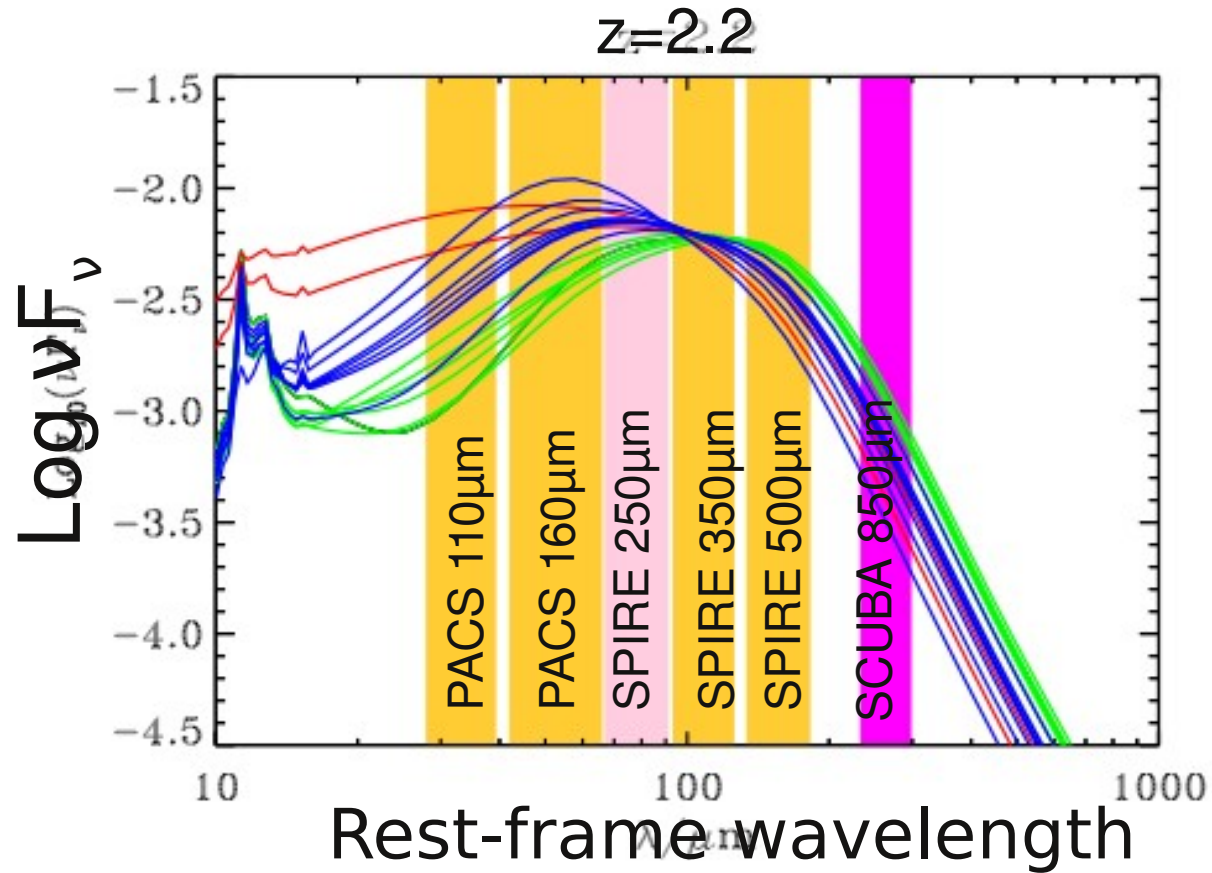
The puzzling nature of hosts galaxies

Is the 24 μ m photometry adequate to extrapolate the total IR ?



The puzzling nature of hosts galaxies

HerMES is coming ... with good news !





Conclusions

The nature of the host galaxies of faint radio sources is still unclear

Comparison of optical/NIR vs radio/IR classification is puzzling

A proper census of the FIR SED is definitely needed

The VLA-SDF is a HerMES Science Demonstration Phase field

Data are already in hands but under embargo

Stay tuned, first results to be published in early May