AMIGA project. Active galaxies in a complete sample of isolated galaxies.

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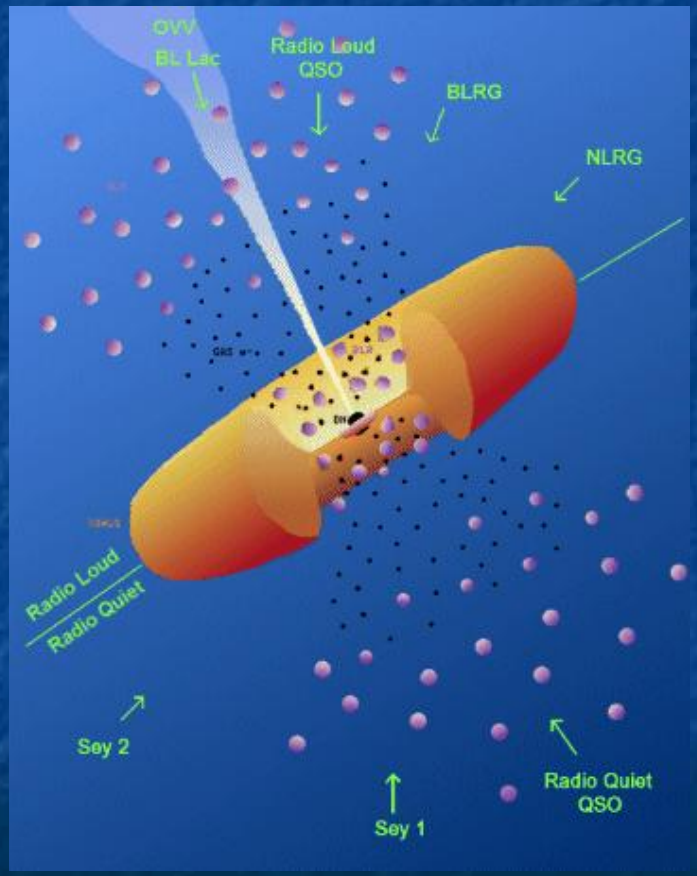
Outline.

- Environment and activity.
- Active galaxies selection.
  1. Literature data.
  2. Radio-excess selection.
  3. FIR colour selection.
  4. Optical spectra.
- Comparison with denser environments.
- Conclusions.

Environment and active galaxies (AGN)

- The central supermassive black hole needs to be fed with gas. Probably the gas falls into the SMBH due to galaxy-galaxy interactions.
- Distinguish between intrinsic evolution and induced evolution of the AGN (nature vs. nurture). This question is not clear yet.
- AGN population in AMIGA isolated galaxies will be a baseline for the study of activity in relation to the environment.

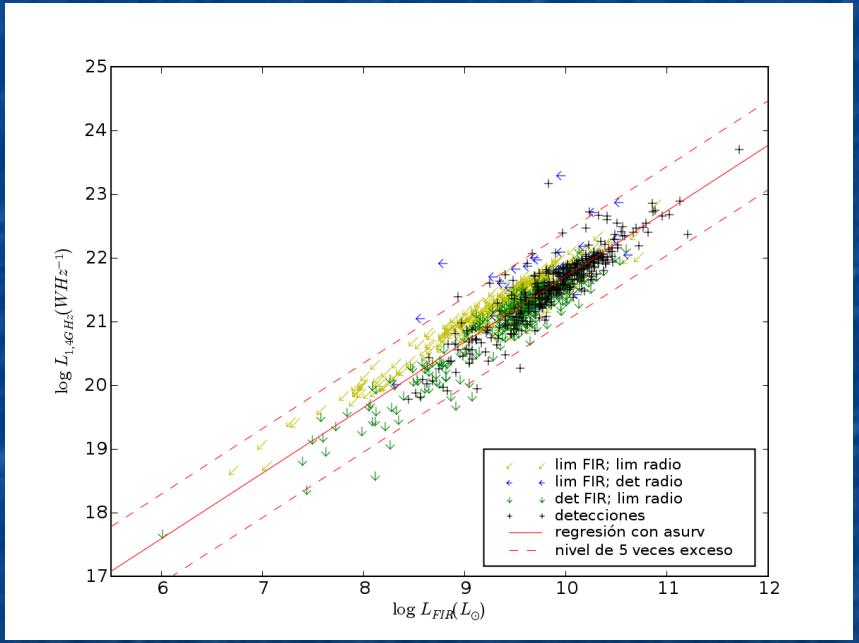


1. Literature data

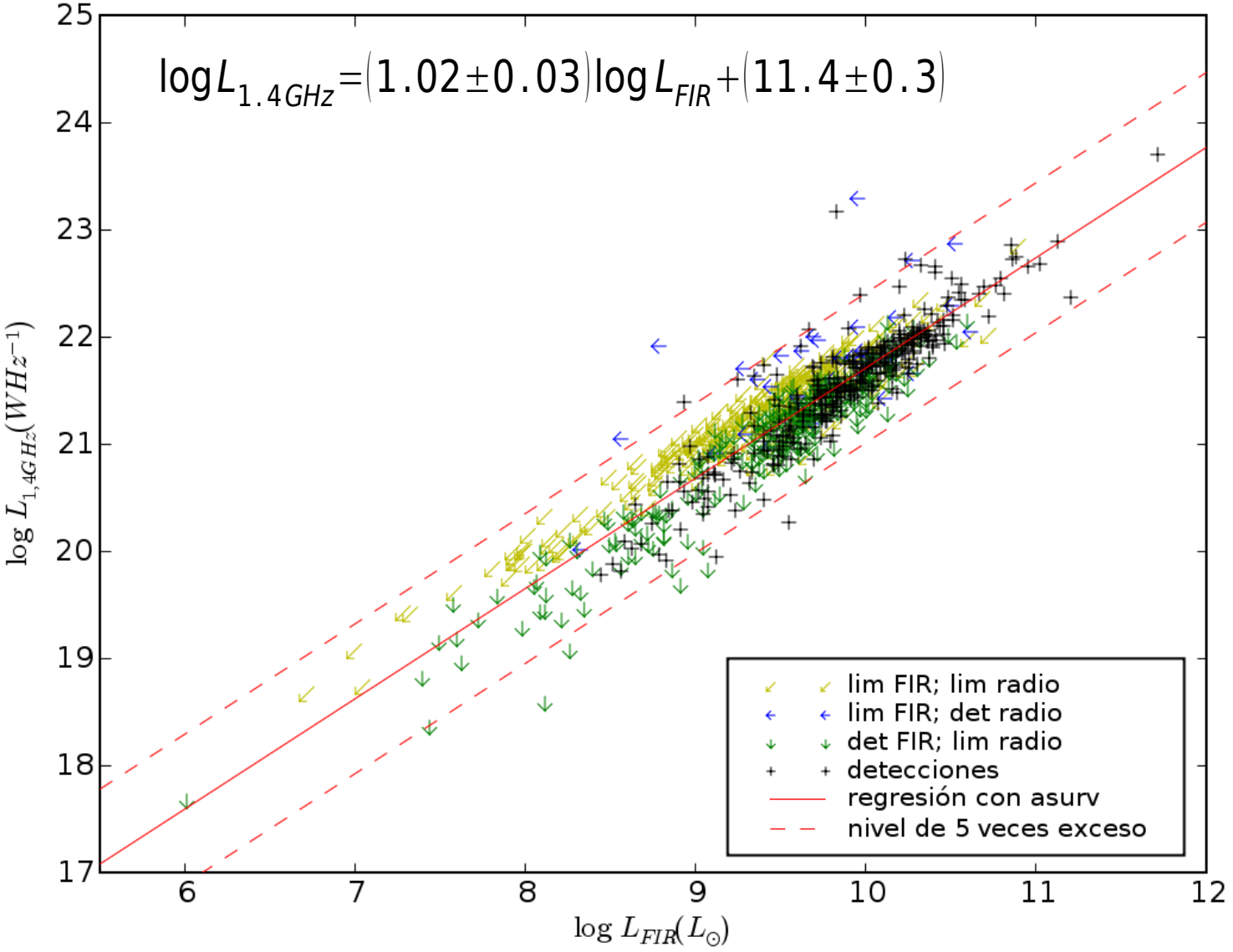
- NED
  - Information on activity type (Seyfert, LINER, starburst, HII).
  - N=77; 22 AGN
- Véron-Cetty [Véron-Cetty & Véron 2003]
  - Active galaxies catalogue. 12th edition.
  - Information on Seyfert type.
  - N=25; 18 AGN

2. Radio-excess selection. Radio-FIR correlation.

- Very tight correlation. Origin: Star formation.
- Radio-excess when radio emission is 5 times greater than FIR emission => radio AGN.
- 7/710 radio-excess galaxies. ~1%
- **Very low rate.**



Sabater et al. 2008


$\log L_{1.4GHz} = (1.02 \pm 0.03) \log L_{FIR} + (11.4 \pm 0.3)$
$\log L_{1,4GHz}(WHz^{-1})$
$\log L_{FIR}(L_\odot)$
25
24
23
22
21
20
19
18
17
6
7
8
9
10
11
12
lim FIR; lim radio
lim FIR; det radio
det FIR; lim radio
detecciones
regresión con asurv
nivel de 5 veces exceso

Background sources.

- Background sources estimate using NVSS ~14.
- VLA study of the radio-excess galaxies.

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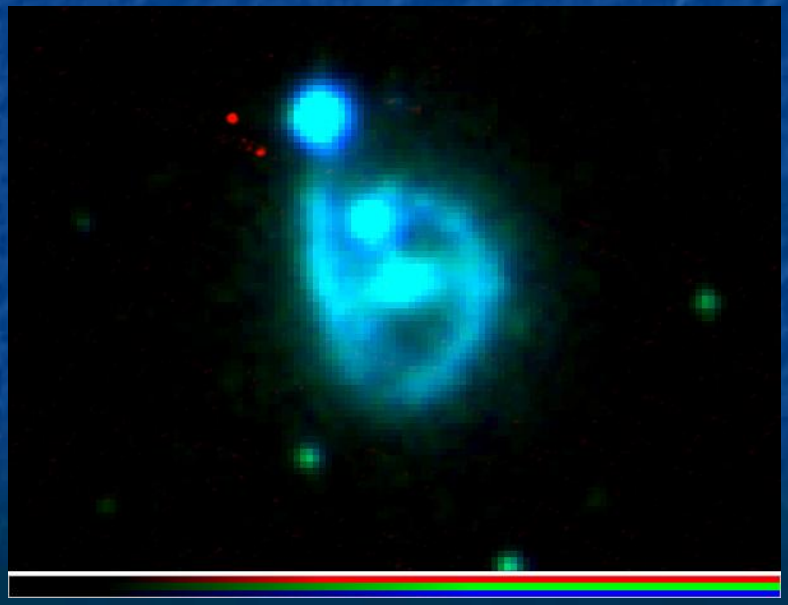
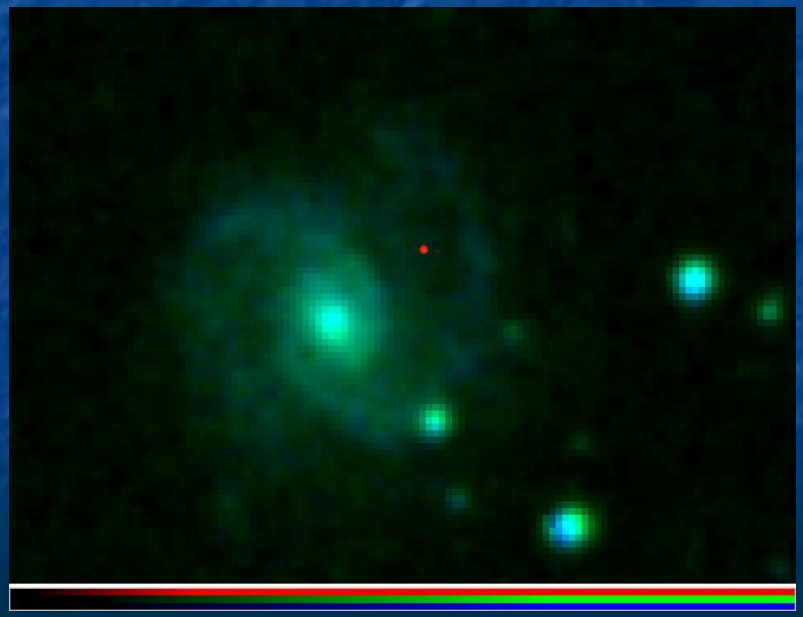
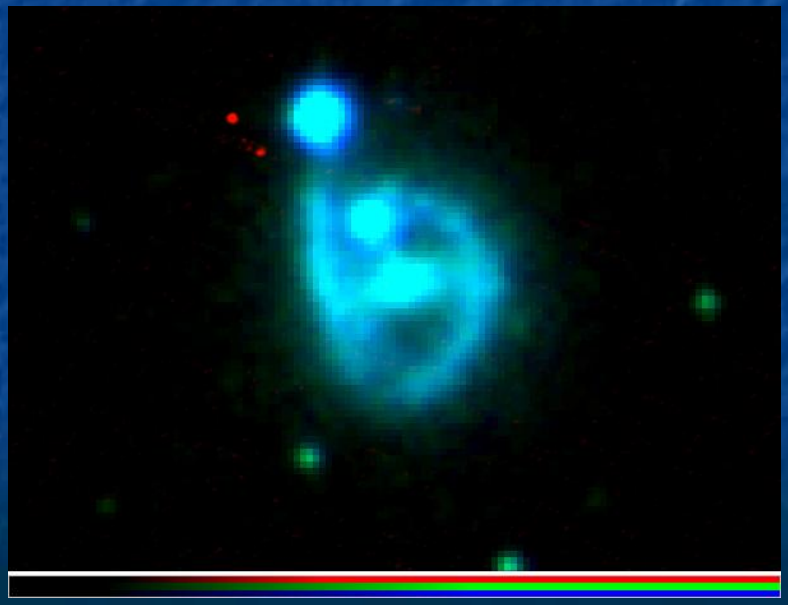
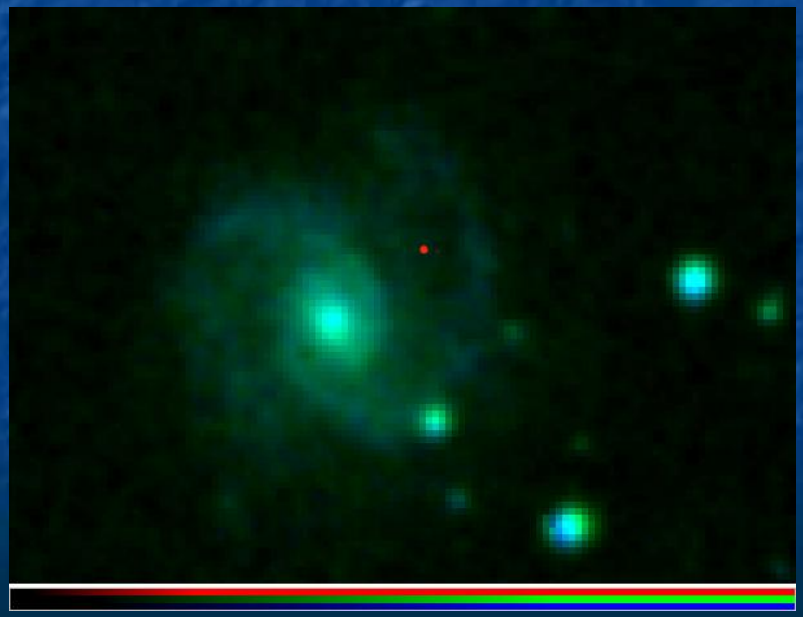




Background sources.

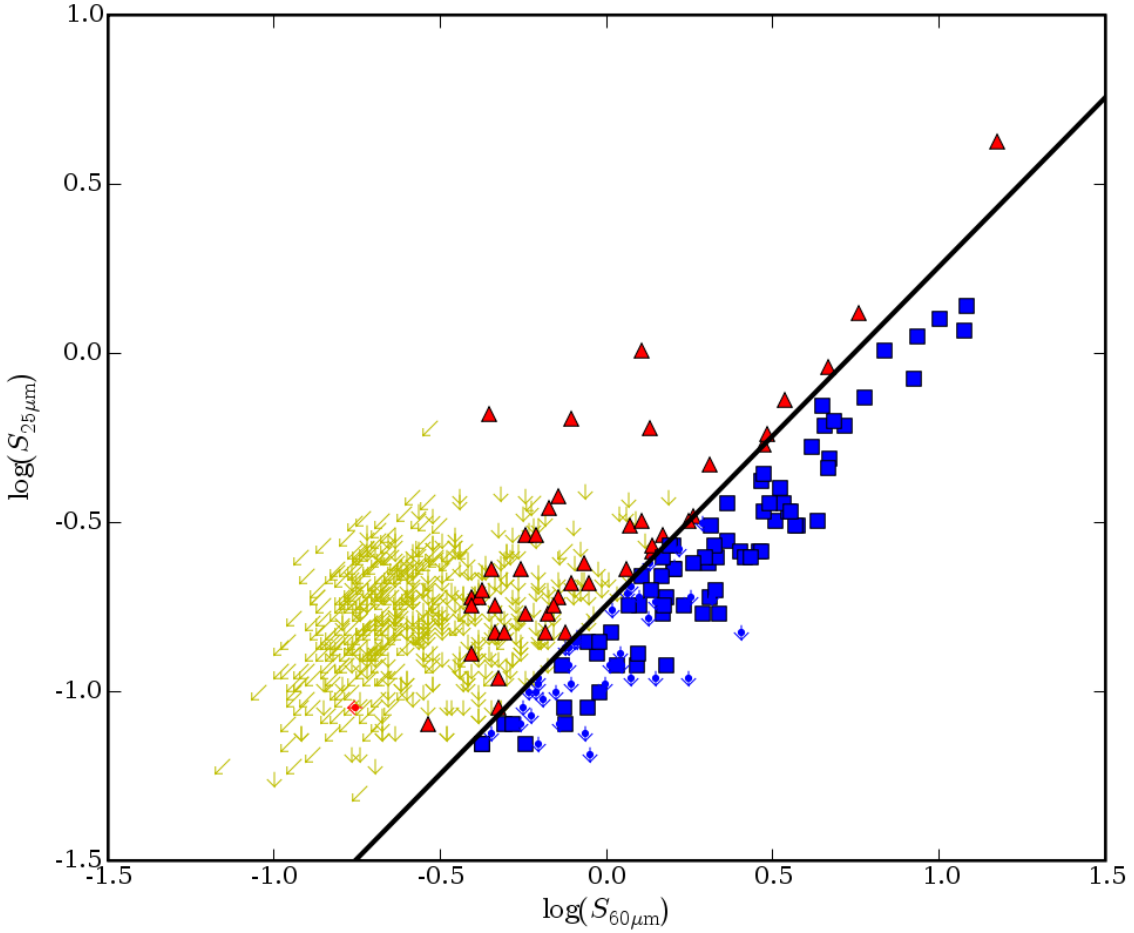
- Background sources estimate using NVSS ~14.
- VLA study of the radio-excess galaxies.
- ALL background sources! **Rate of radio-excess galaxies = 0%.**





3. IRAS colour selection.

- Selection criterion of Yun et al. 2001: $S_{25\mu m}/S_{60\mu m} > 0.18$
- 58 AGN candidates.

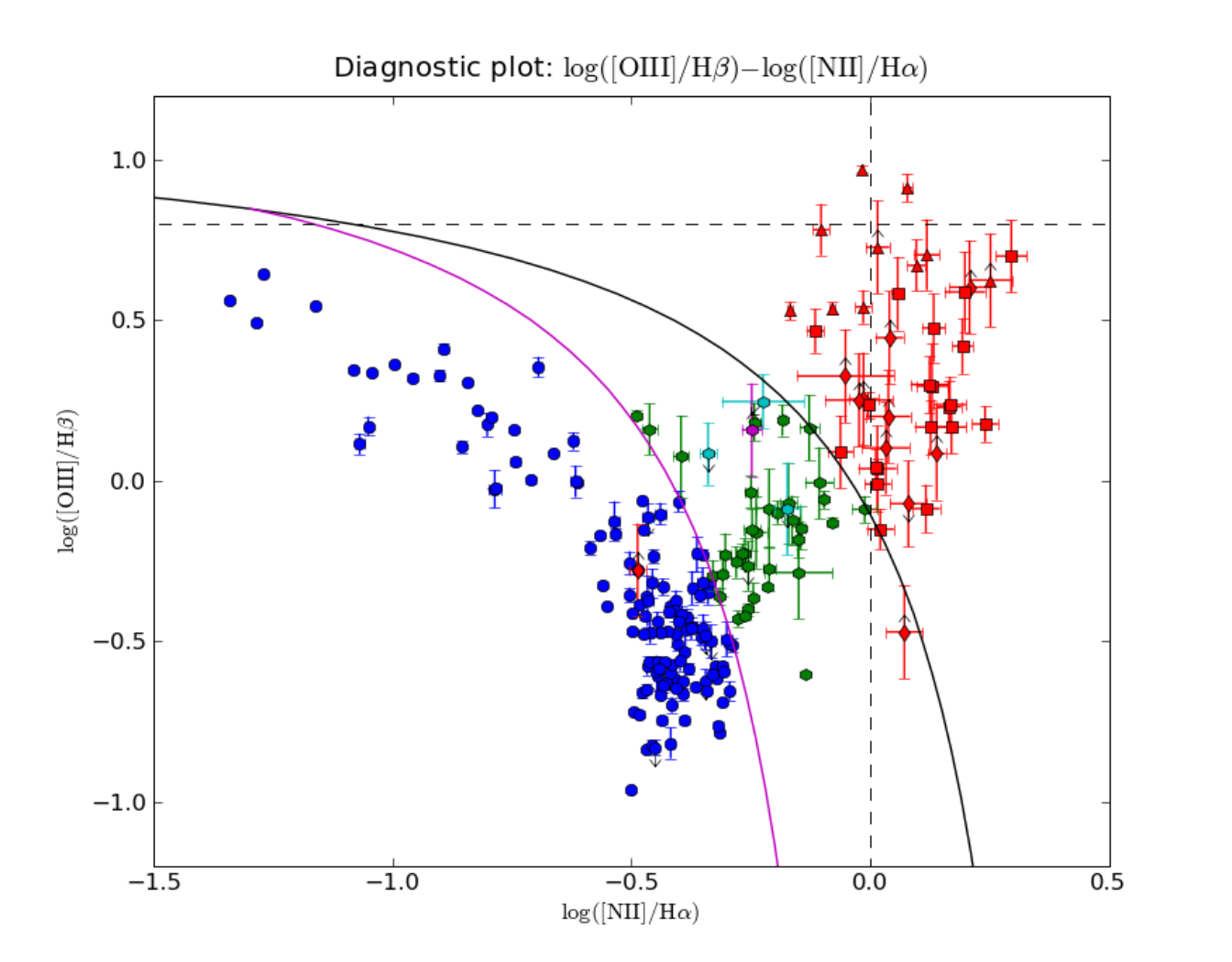


Sabater et al. 2008

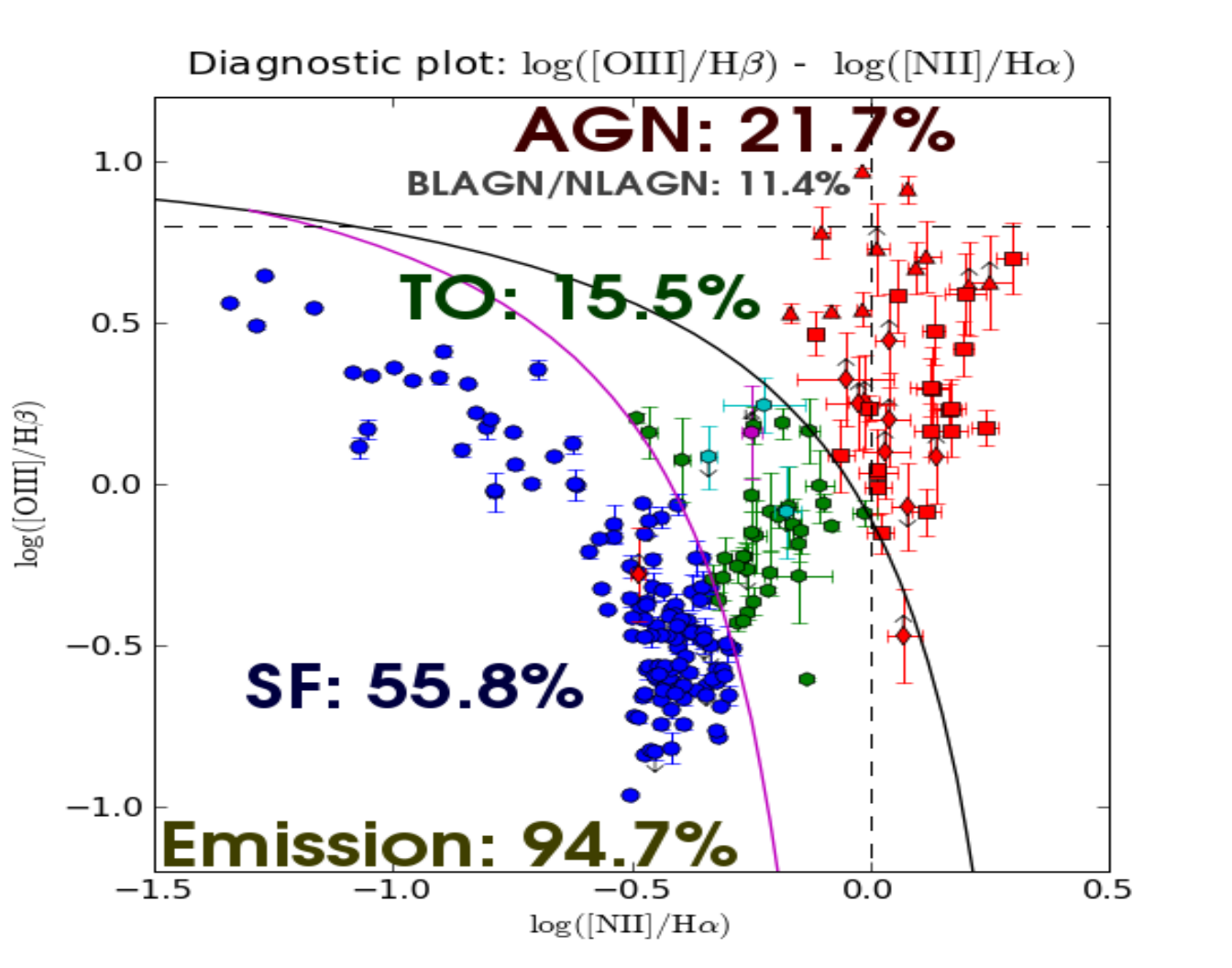
4. Optical spectra

- Sloan Digital Sky Survey – Data Release 6.
  - 353 spectra.
- Subtraction of stellar populations using Starlight.
- Fit of the lines.
- BPT diagnostic diagrams.
- Ongoing study.

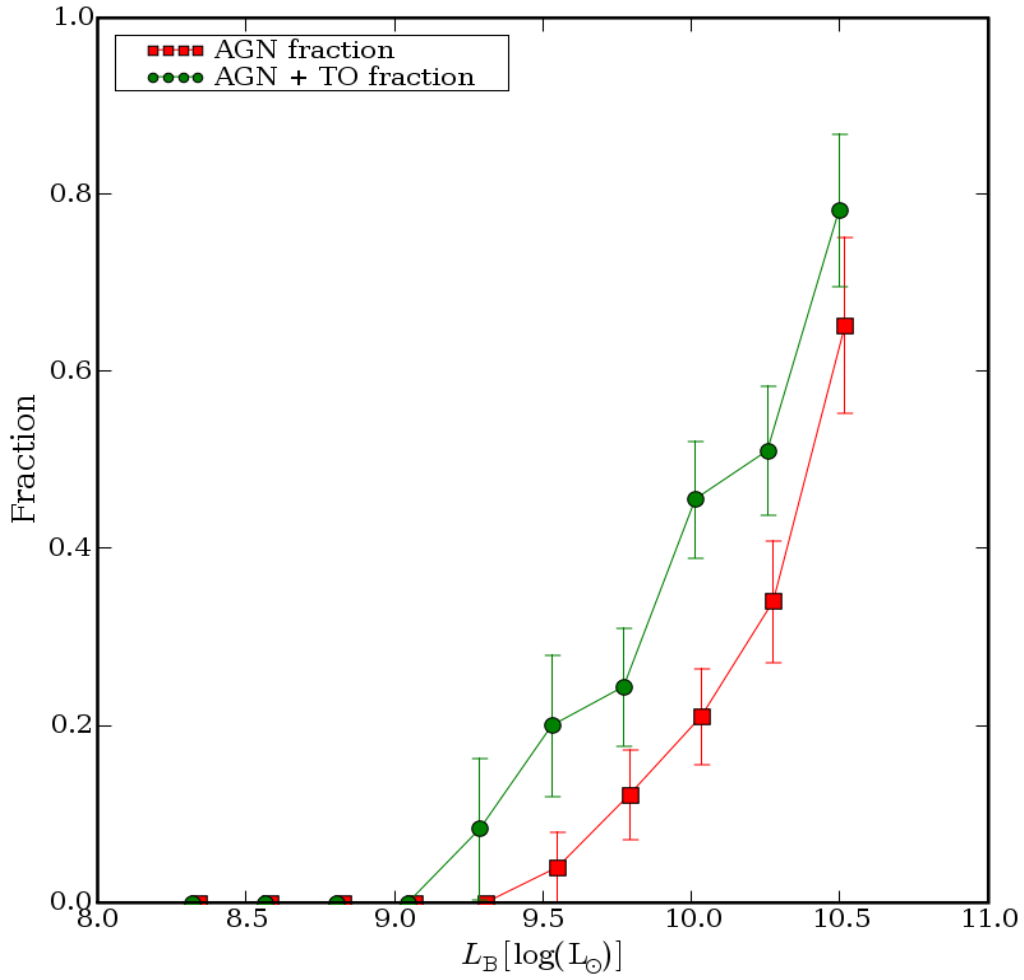
Diagnostic


Diagnostic plot: log([OIII]/Hβ)−log([NII]/Hα)
1.0
0.5
0.0
−0.5
−1.0
log([OIII]/Hβ)
−1.5
−1.0
−0.5
0.0
0.5
log([NII]/Hα)

Diagnostic

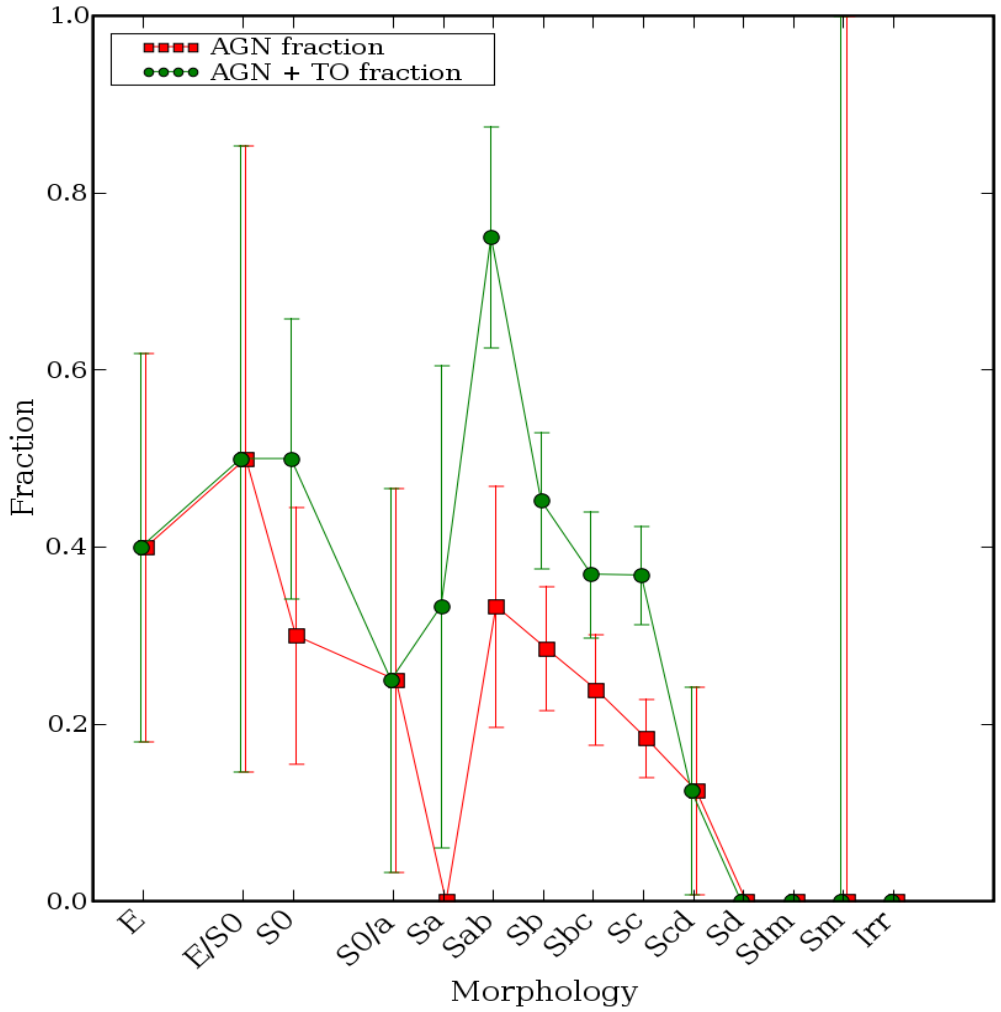

Diagnostic plot: log([OIII]/Hβ) - log([NII]/Hα)
AGN: 21.7%
BLAGN/NLAGN: 11.4%
TO: 15.5%
SF: 55.8%
Emission: 94.7%
log([OIII]/Hβ)
log([NII]/Hα)
1.0
0.5
0.0
−0.5
−1.0
−1.5
−1.0
−0.5
0.0
0.5

AGN fraction - luminosity



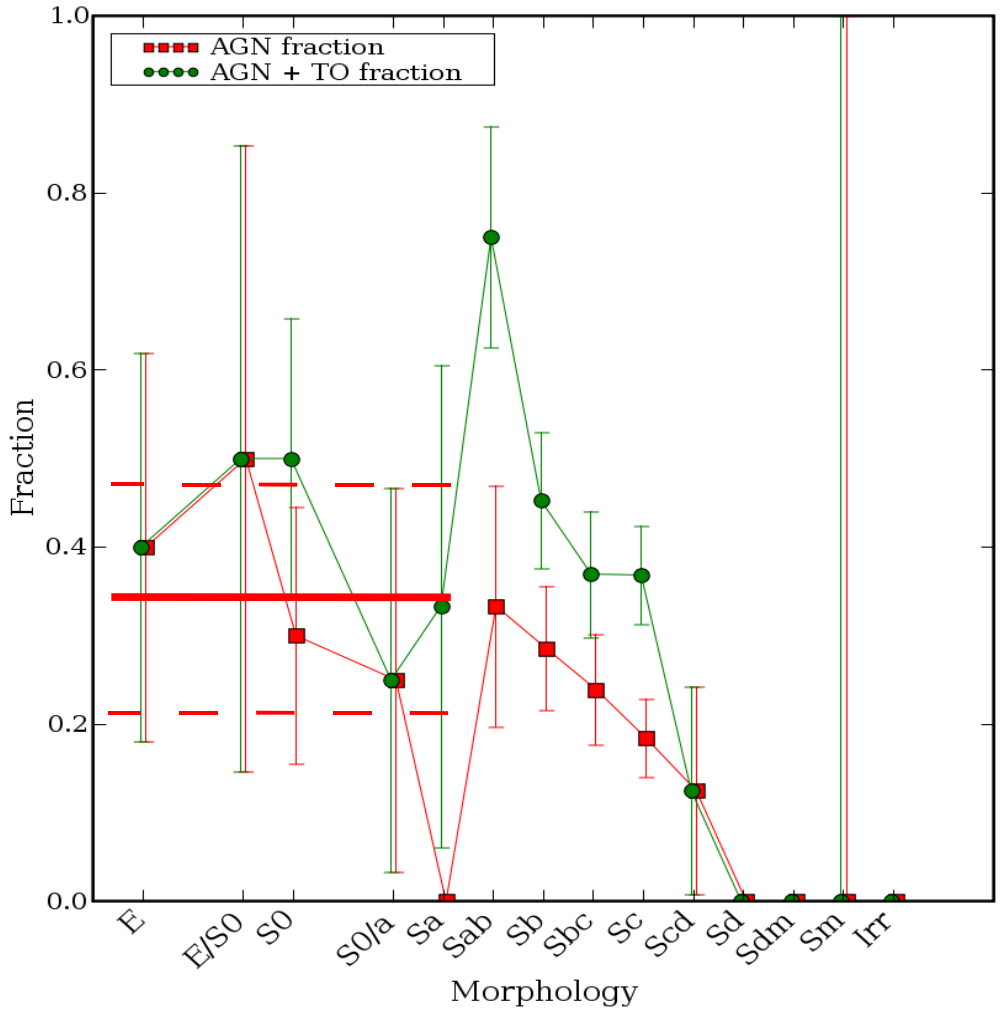
- Step increase of the fraction of AGN with luminosity

AGN fraction - morphology



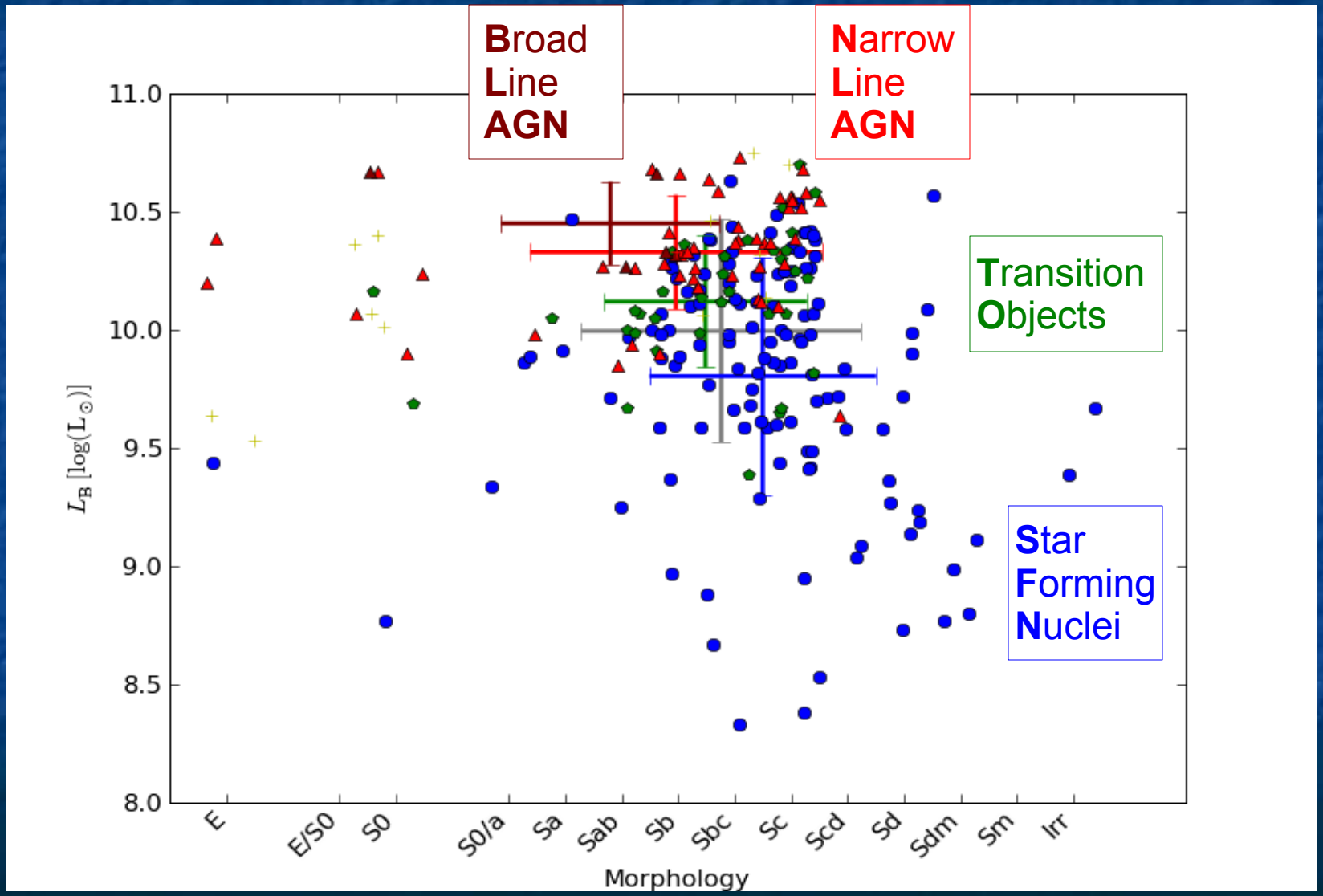
- Increase of the fraction of AGN towards early types

AGN fraction - morphology

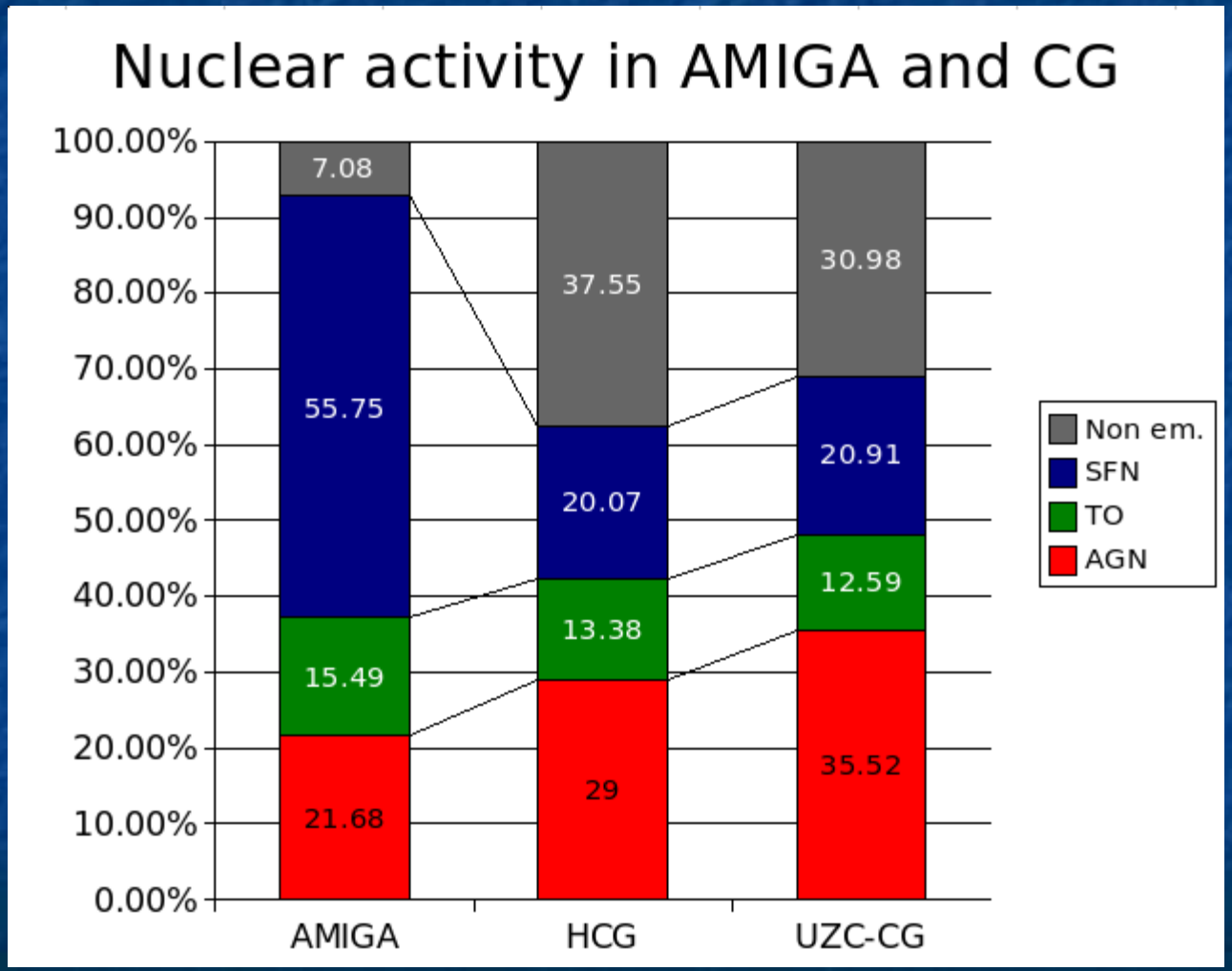


- Increase of the fraction of AGN towards early types

Luminosity – morphology - AGN

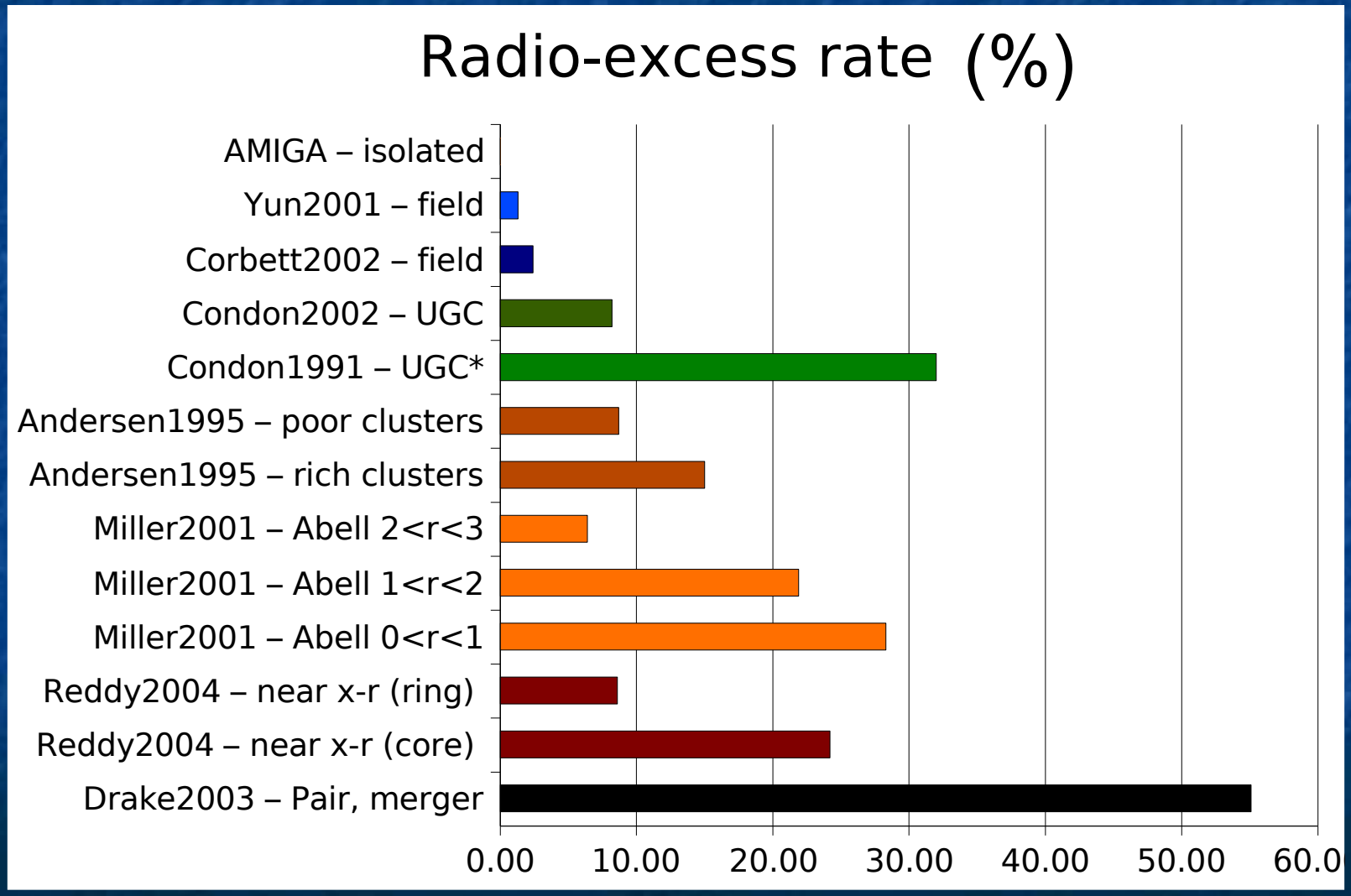


Comparison with denser environments – optical AGN



Martinez et al. 2008 – Talk 14th May at 10:00

Comparison with denser environments – radio AGN



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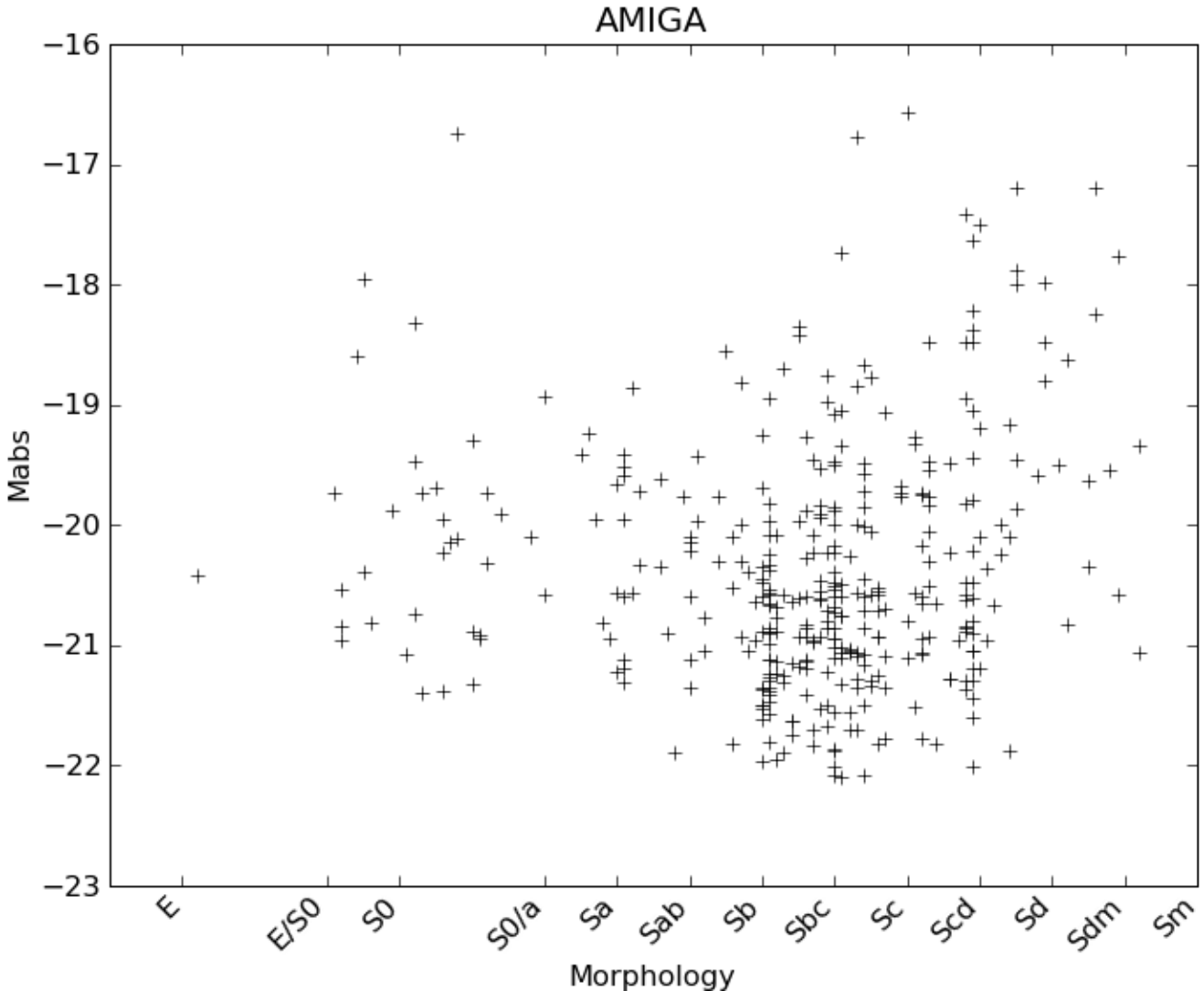

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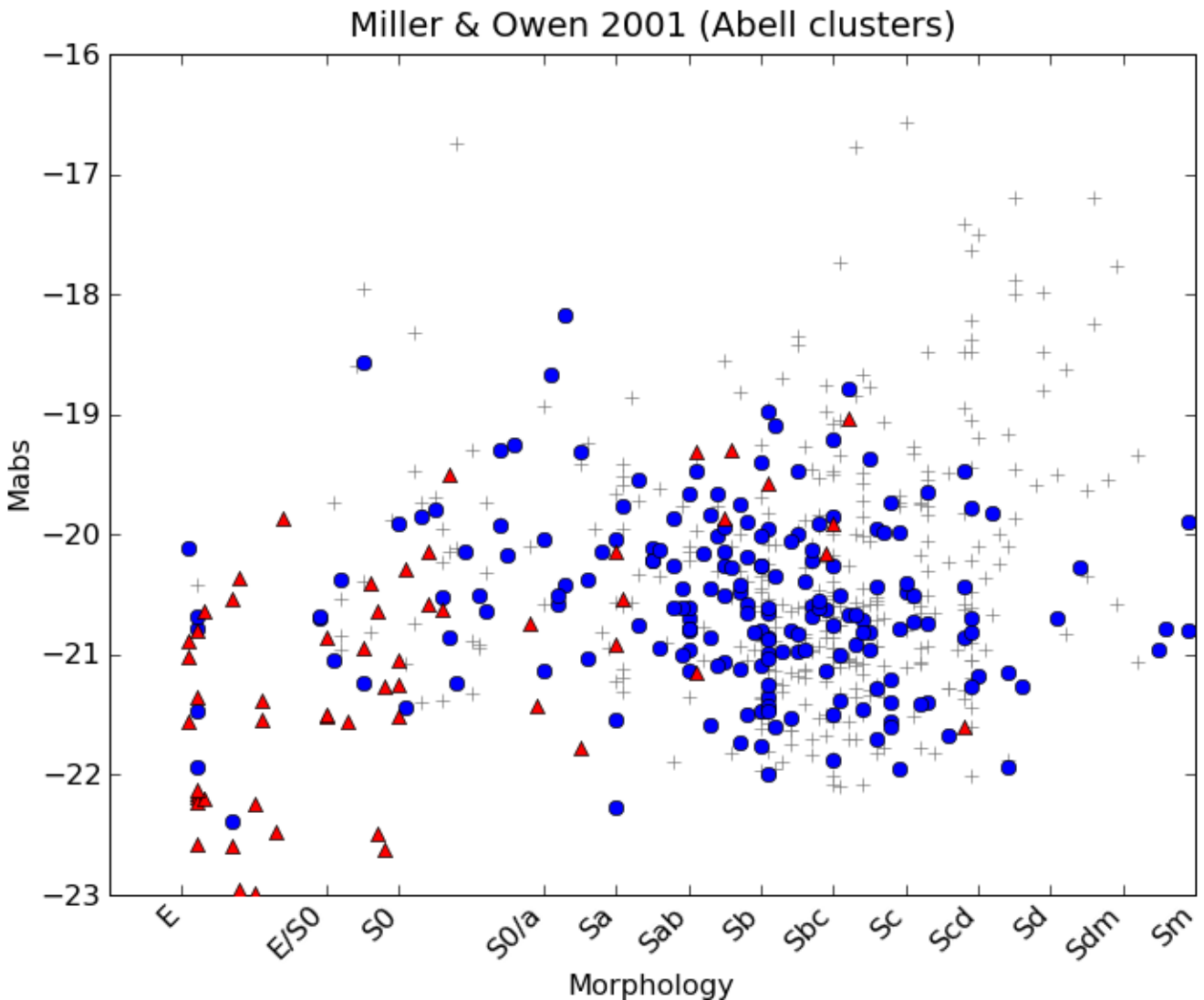

Conclusions.

- Final catalogue of active galaxies for the sample of isolated galaxies. Selected using literature data, radio-excess, FIR colour and optical spectra.
- ~21% of optically selected AGN. Significative fraction for a sample of isolated galaxies.
- Very low rate of radio-excess galaxies (~ 0%) compared to galaxies in denser environments.
- Not only explained by the luminosity / morfology-density relation.
- **Environment is fundamental for triggering radio AGN.**