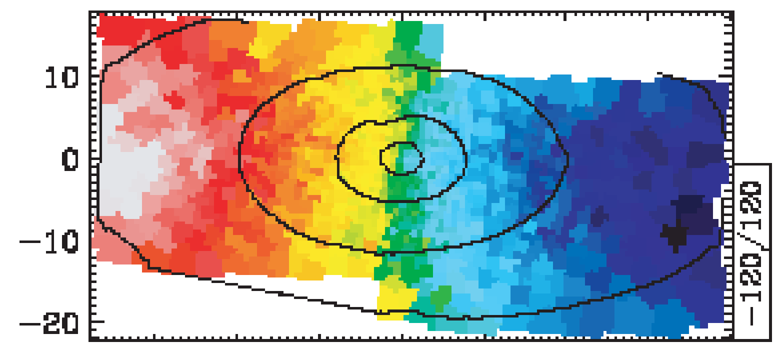
The Polar Disc in NGC 2768:

CO, HI + optical IFU observations

gri image



SAURON stellar velocity

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with
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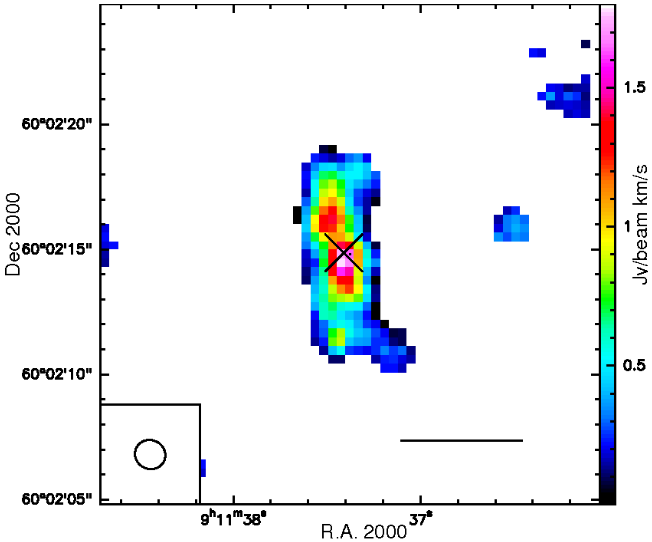
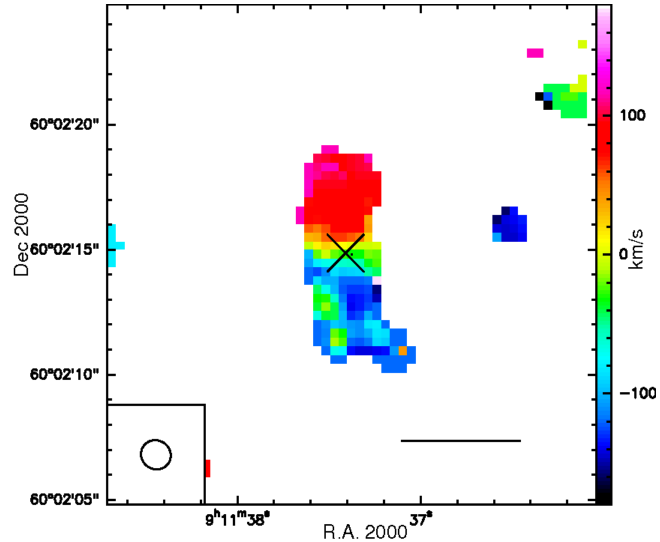
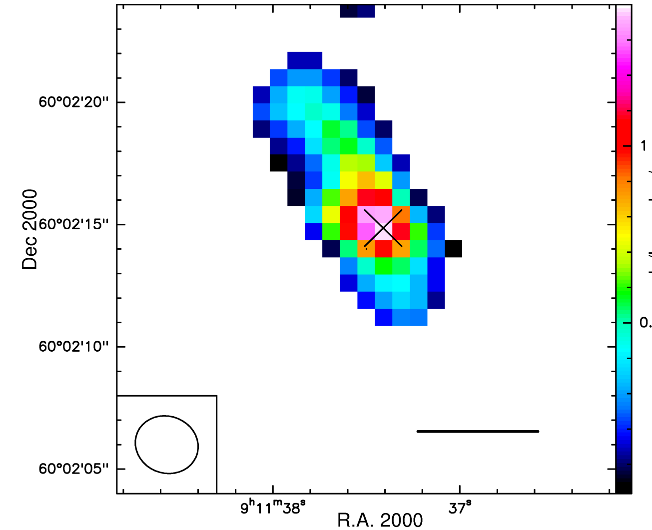


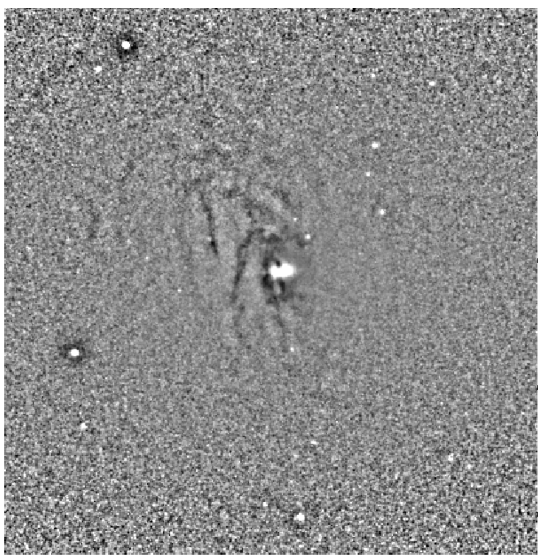
CO(2-1) intensity



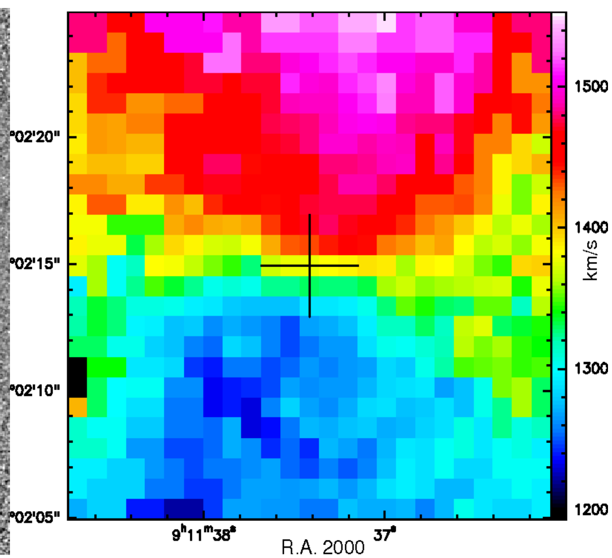
CO(2-1) velocity



CO(1-0) intensity



dust

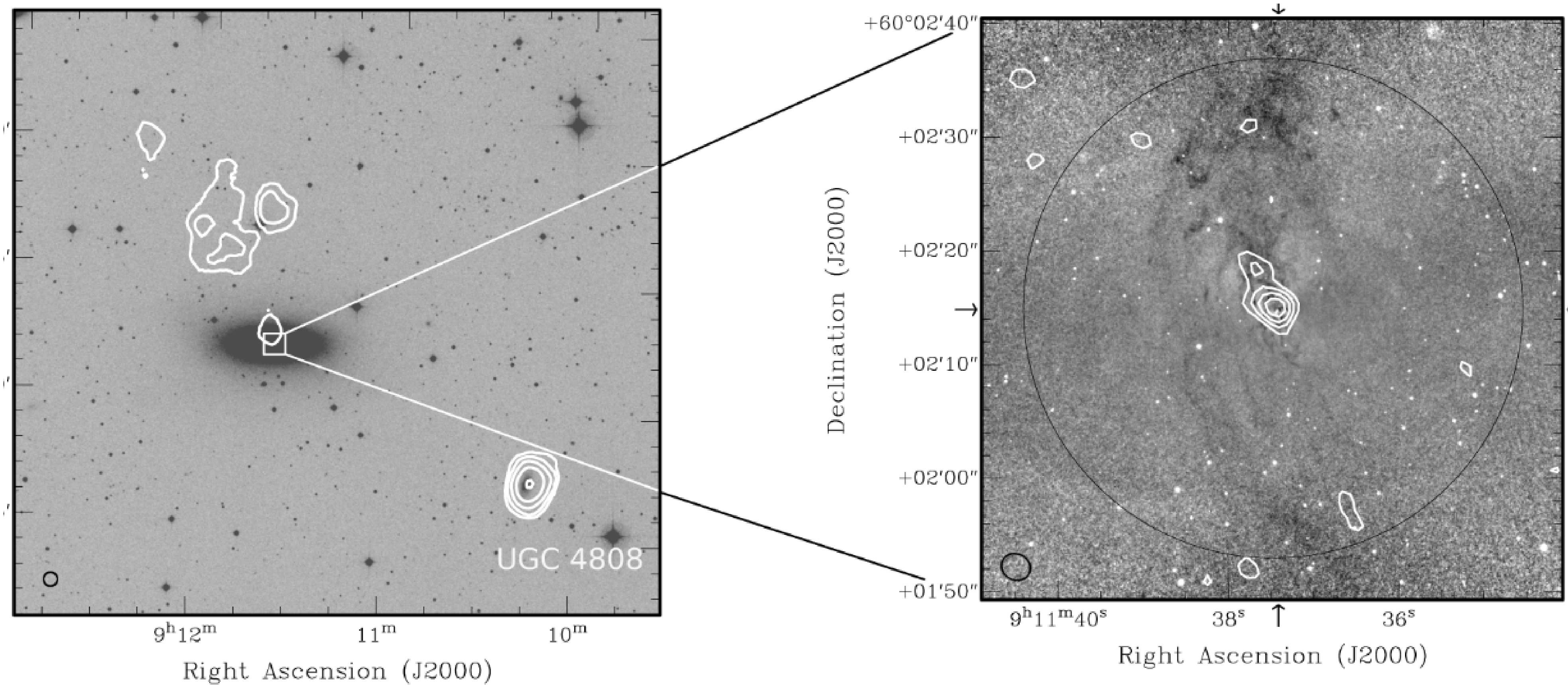


Ionised gas velocity

The polar disc

- CO (PdB interferometer)
- ~400 pc in radius
- 6.4 x 10^7 M_{sun} of molecular gas
- ionised gas (SAURON)
- related dust structure

Origin of the Cold Gas



HI contours (white) over DSS image

CO(1-0) contours over dust map

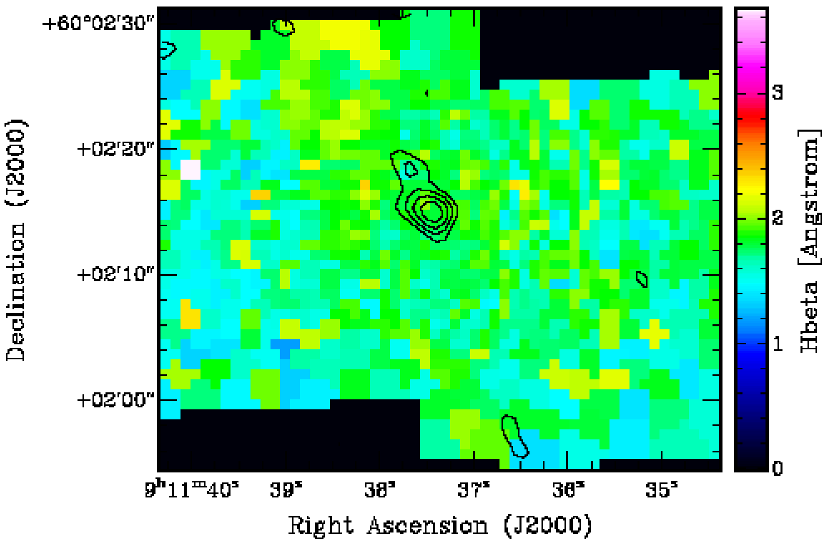
(Morganti et al. 2006)

-asymmetric in HI, dust and CO- all stronger to the north/northeast: can follow accretion from 30 kpc (HI) to inner 1 kpc (CO)

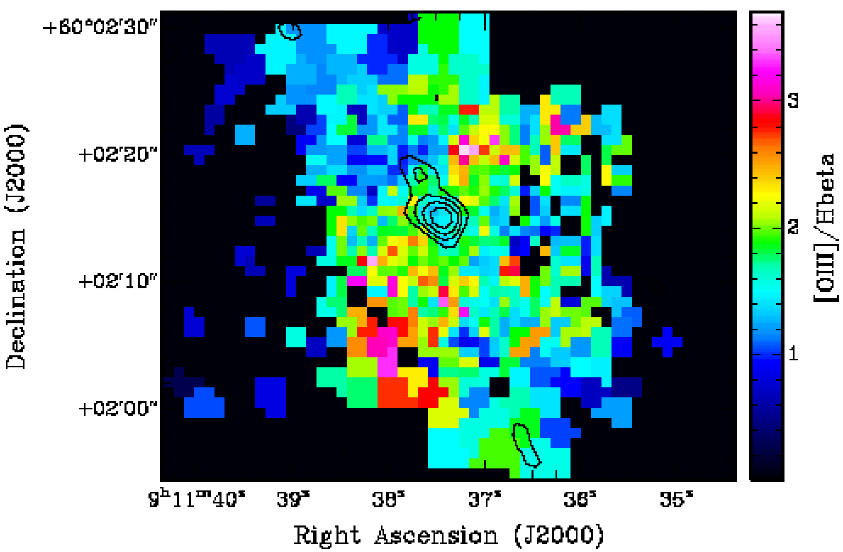
Star Formation (?)

-no coincident increase in Hβ linestrength
-OIII/Hβ ratio not low enough to be definitely star forming
-but sigma drop is present- from a young, dynamically cold population???

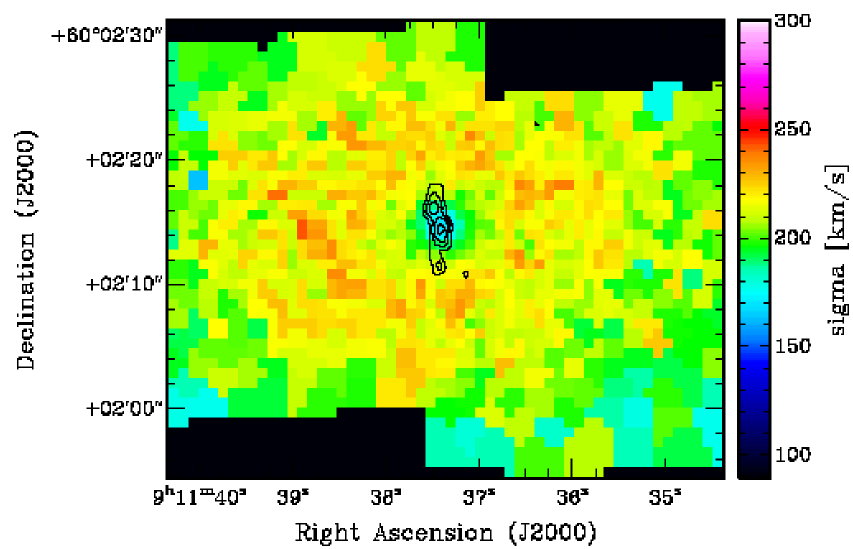
Star formation is not clear, but possible.



Hβ linestrength



OIII/Hβ emission line ratio



Stellar velocity dispersion

Conclusions for NGC 2768

- Small polar molecular disk
- External origin
- Possible star formation
- (see Crocker et al. 2008 for more details...)

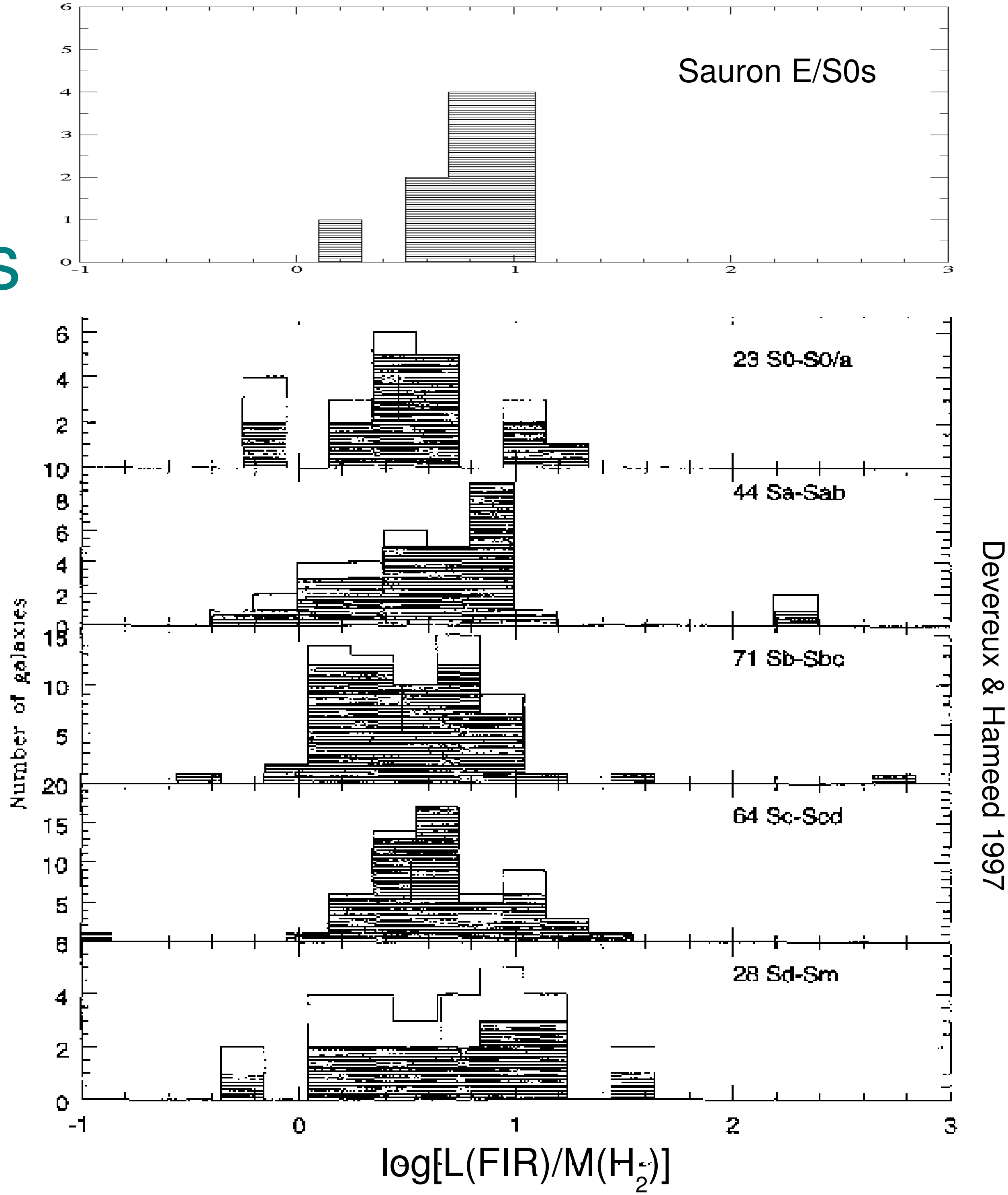
And more general Questions...

- Absent or just hidden star formation?
- Are classic star formation tracers valid in early types?
- Can molecular gas be stable?

Star Formation Indicators: E/S0s vs. spirals

1. L(FIR)/M(H_2)

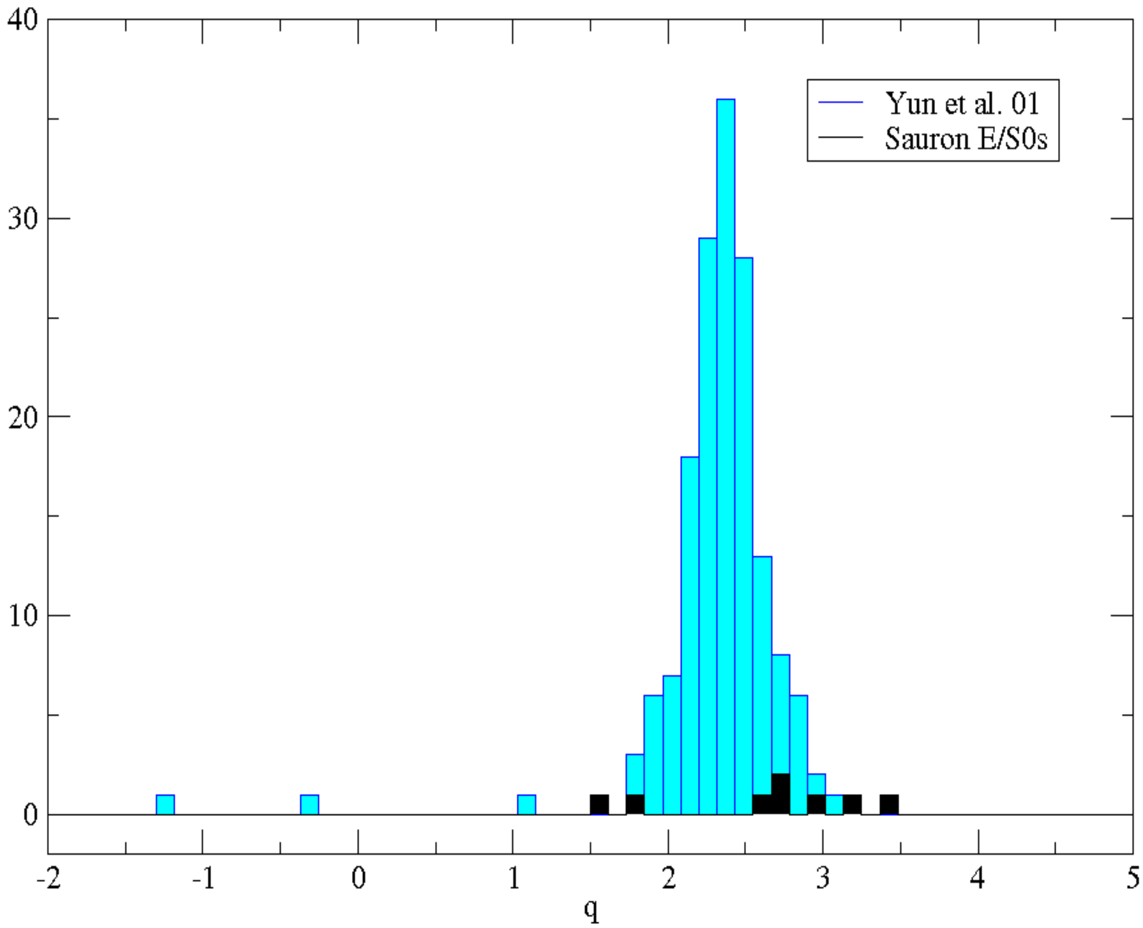
- not very different from spirals
- if L(FIR) accurately traces SFR, this implies normal star formation efficiency from a unit mass of cold gas



Star Formation Indicators: E/S0s vs. spirals

2. L(FIR)/L(1.4 GHz)

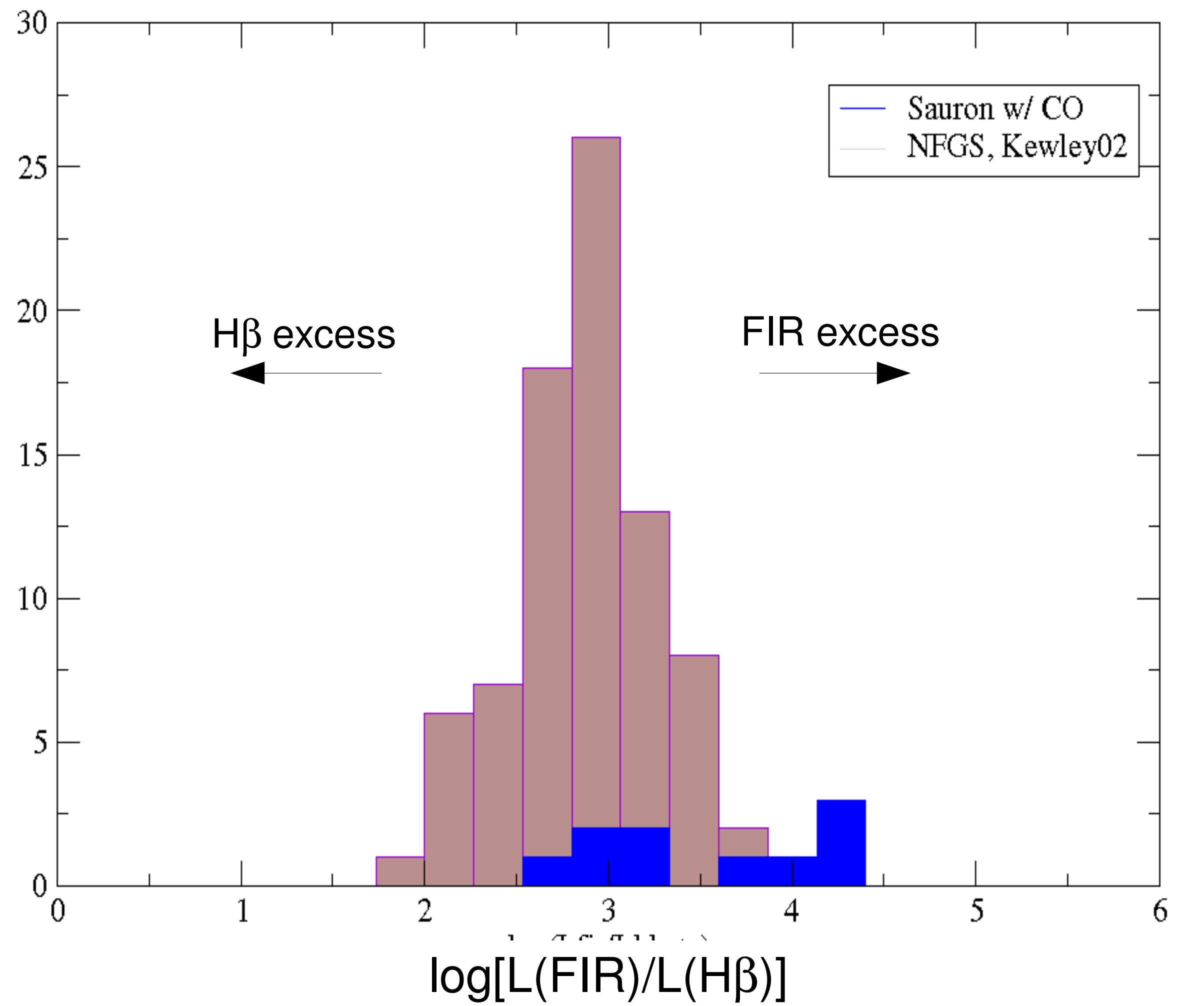
- measured by q=log(S(FIR)-S(1.4GHz))
- two to the left are radio AGN
- others all seem to be FIR-excess... why?
  - Yun et al. 2001 note that weaker FIR galaxies (L(FIR) < 10^9 L_{sun}) tend to have higher q values
  - dust-enshrouded AGN?



Star Formation Indicators: E/S0s vs. spirals

3. L(FIR)/L(Hβ)

- neither sample corrected for reddening/extinction
- two to the left are radio AGN
- others all seem to be FIR-excess... why?
  - Yun et al. 2001 note that weaker FIR galaxies (L(FIR) < 10^9 L_{sun}) tend to have higher q values
  - dust-enshrouded AGN?



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