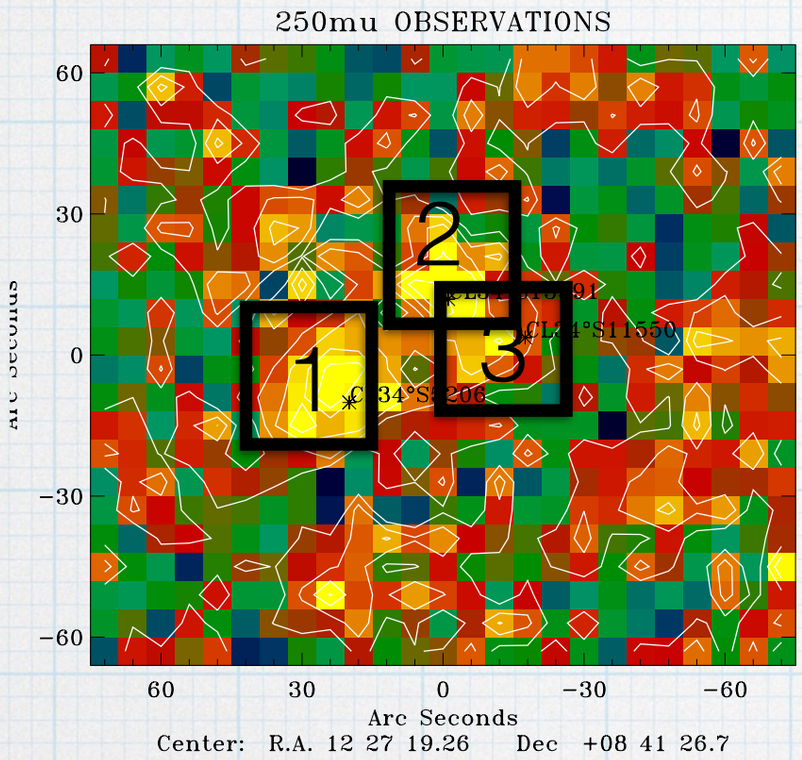
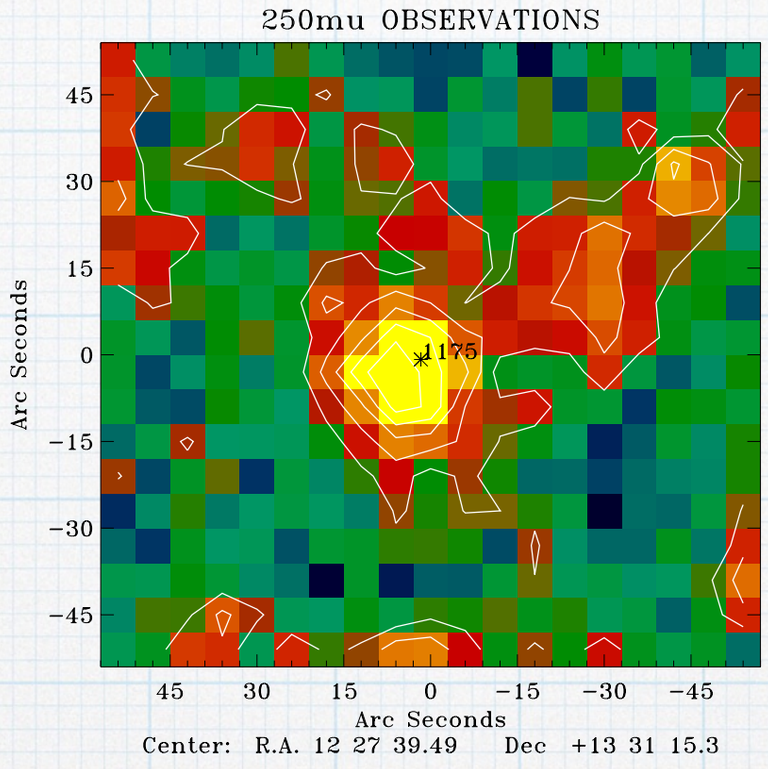
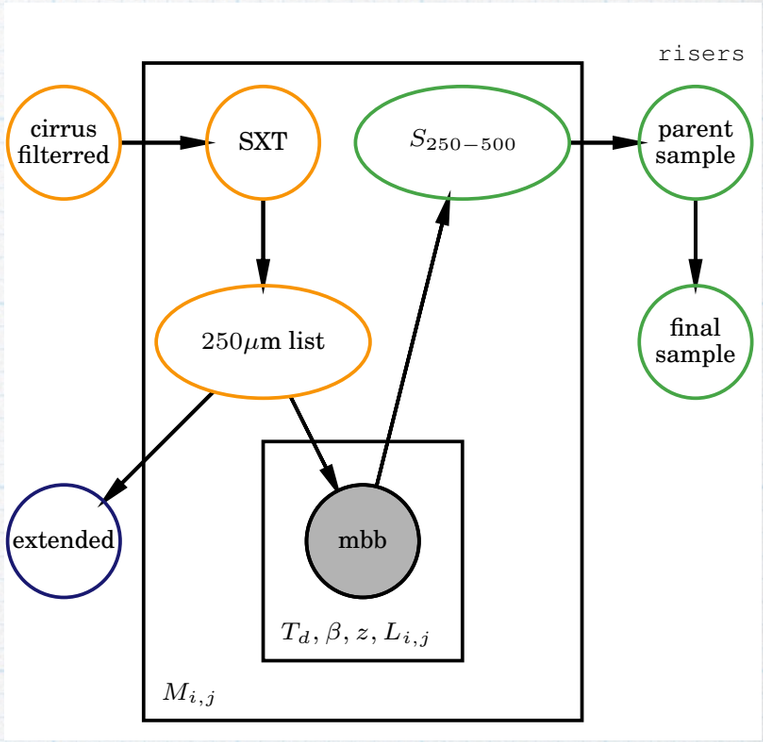
FIR-risers: A new source extraction algorithm



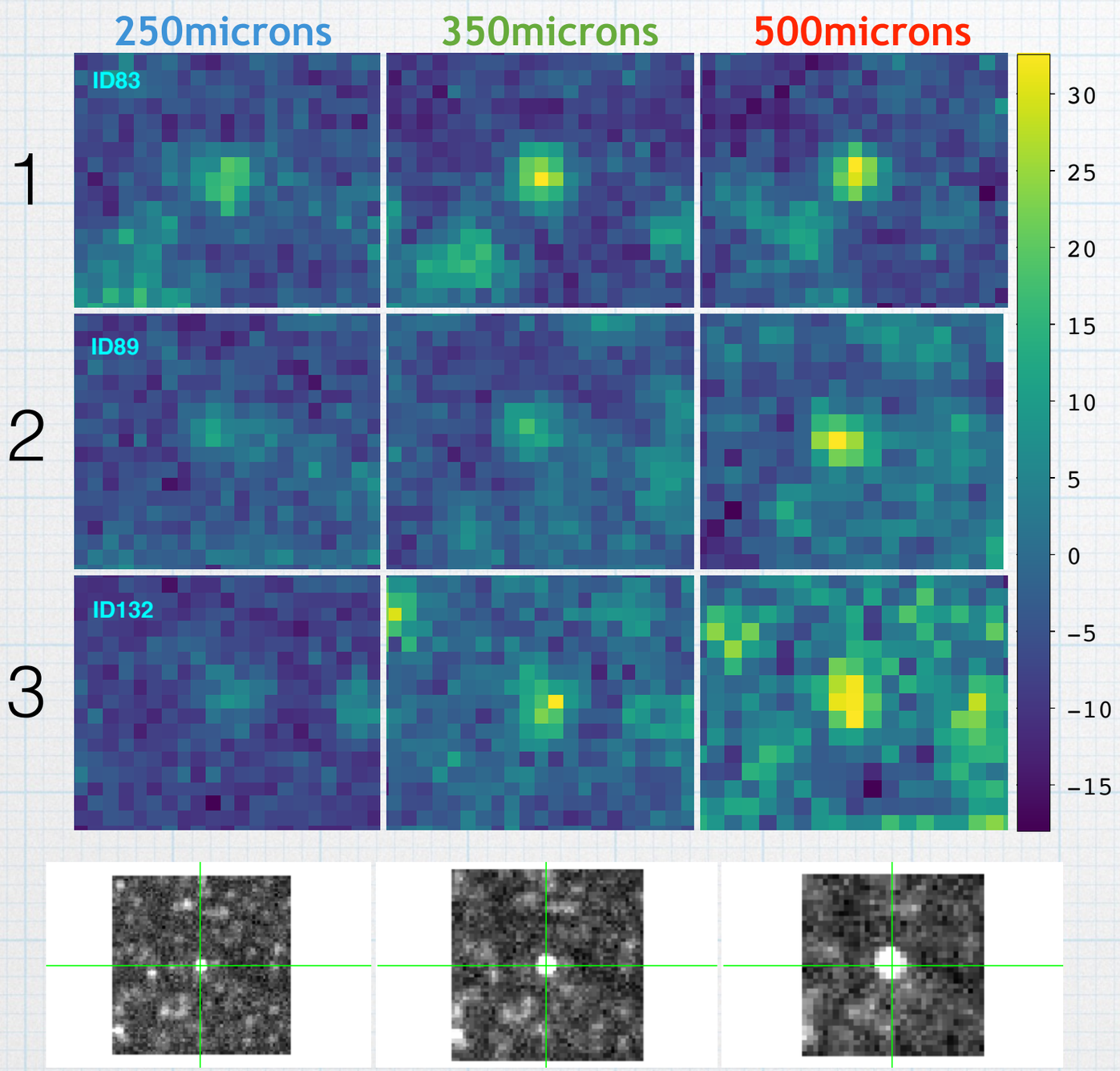




New criteria to select “FIR-risers”

a) S500>S350>S250
b) S500>30 mJy (>4 sigma total)
c) S250>13.2 mJy (3 sigma conf)
d) Remove bright radio sources due to their offset from FIR-radio correlation.

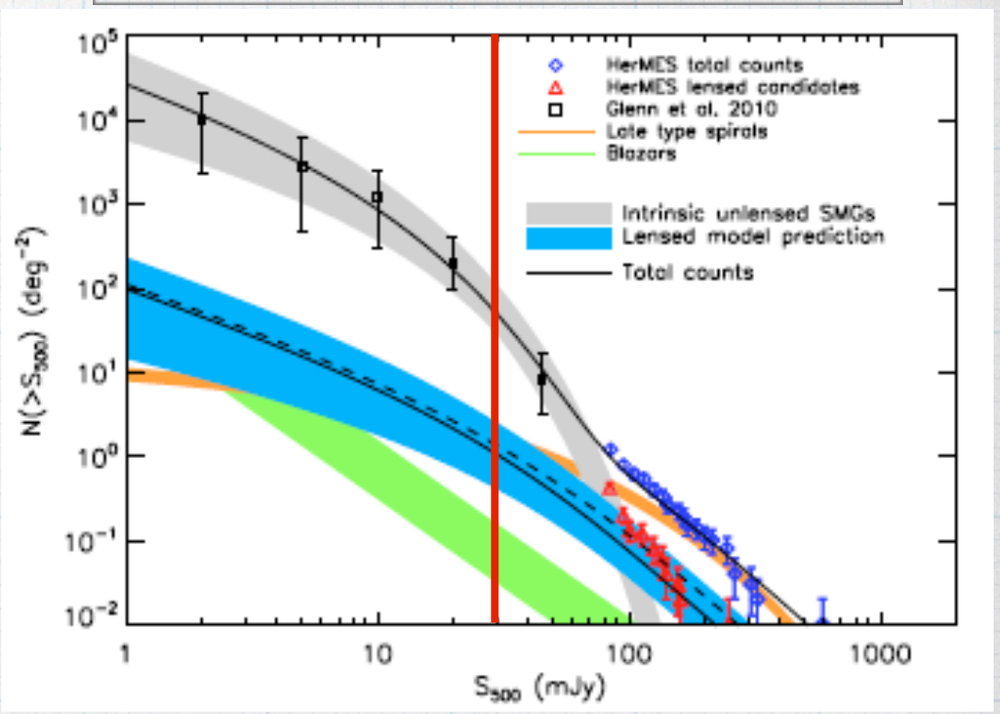
2D cutout examples of "FIR-risers"



ID3087- dusty QSO-like object (z=1.0)

Nature of sources?
For a flux-cut at S>30 mJy at 500 microns, contribution from:

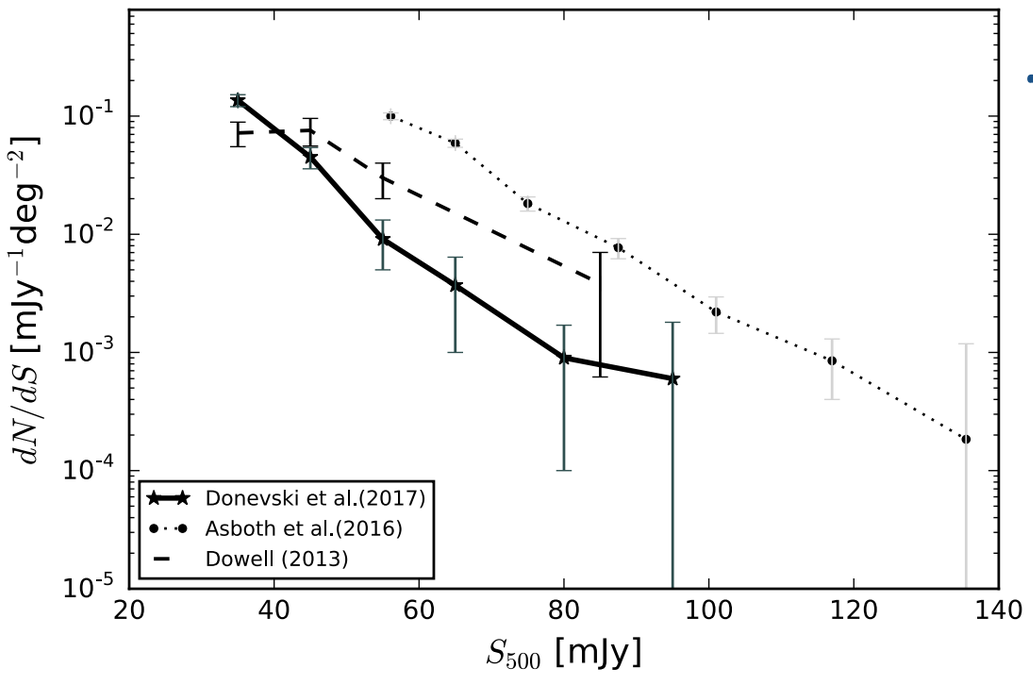
1. Radio AGNs
2. Gravitational lenses
3. Unlensed dusty galaxies (mergers ?)



(Wardlow et al. 2013)

Differential number counts

(Donevski et al. 2017, in prep.)



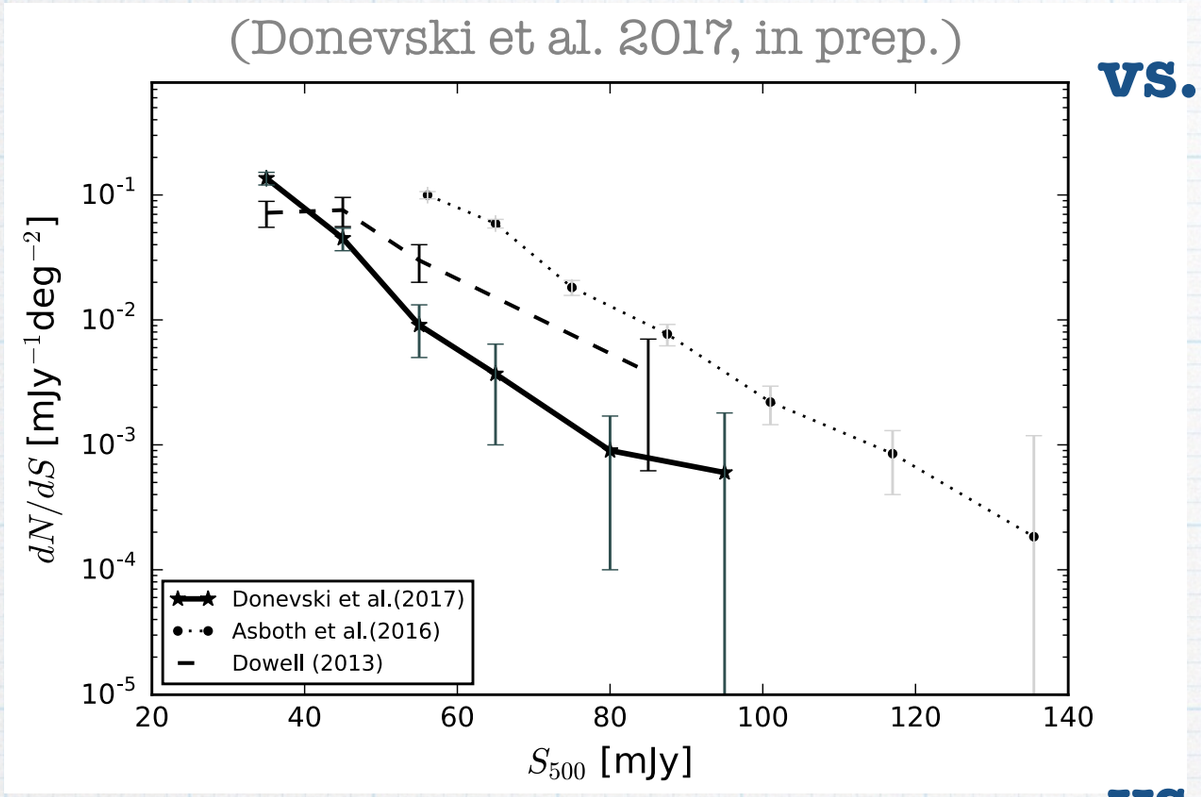
vs. observations

vs. models

Table 3: Comparison of models used in our analysis.

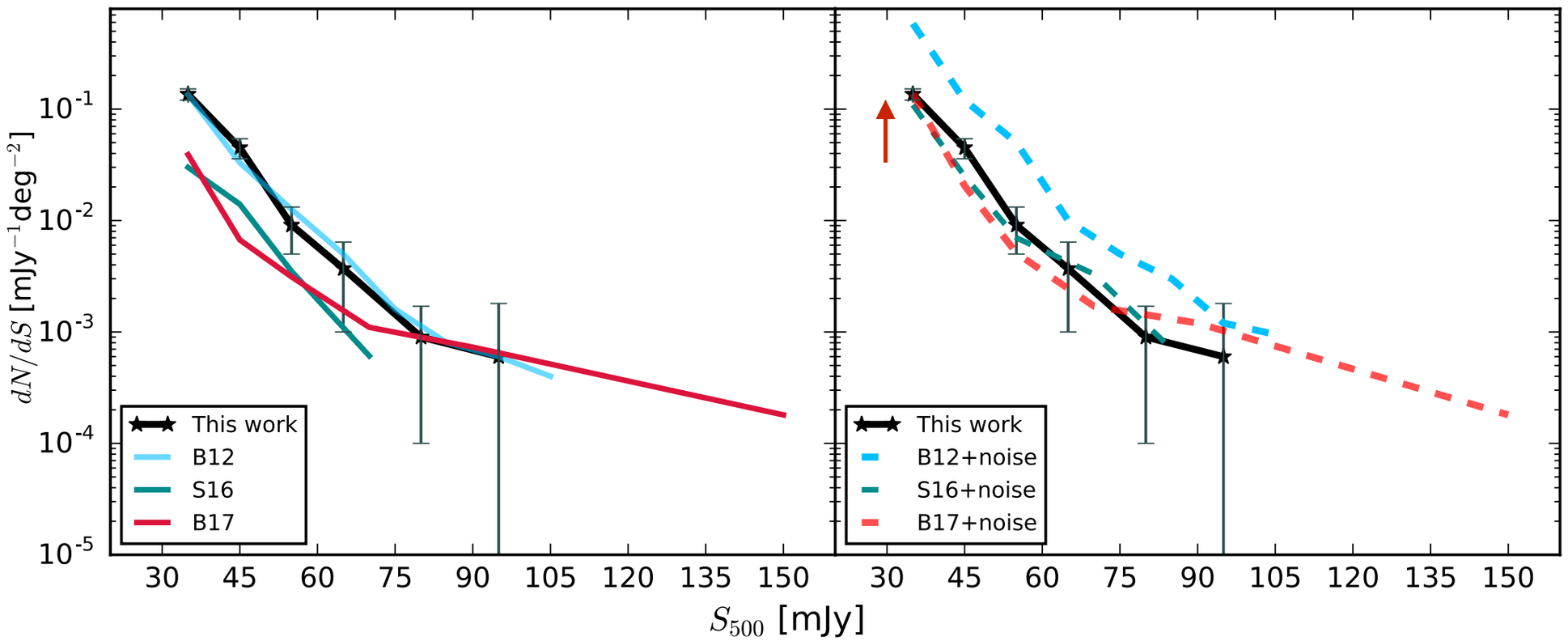
Models	Bethermin+ 12	Bethermin+ 17	Schreiber+ 16
Formalism[(1)]	2SFM	2SFM	2SFM
sSFR[(2)]	evolves up to $z = 2.5$	evolves up to $z = 4$	evolves continuously
Dispersion ($\sigma_{\rm MS}$)[(3)]	0.15 dex	0.3 dex	0.3 dex
Strong lensing	Yes	Yes	No
Passive galaxies	Yes	Yes	Yes
Evolution of $T_{\rm dust}$	up to $z = 2$	up to $z = 4$	continuous
AGN contribution	Yes	Yes	No

Differential number counts



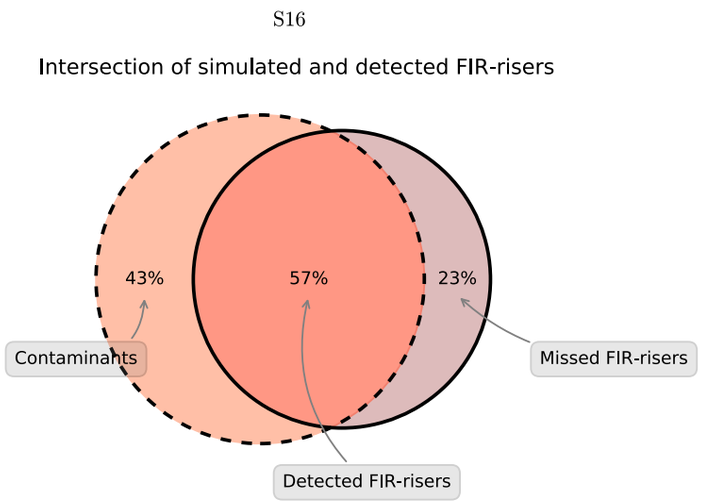
vs. observations

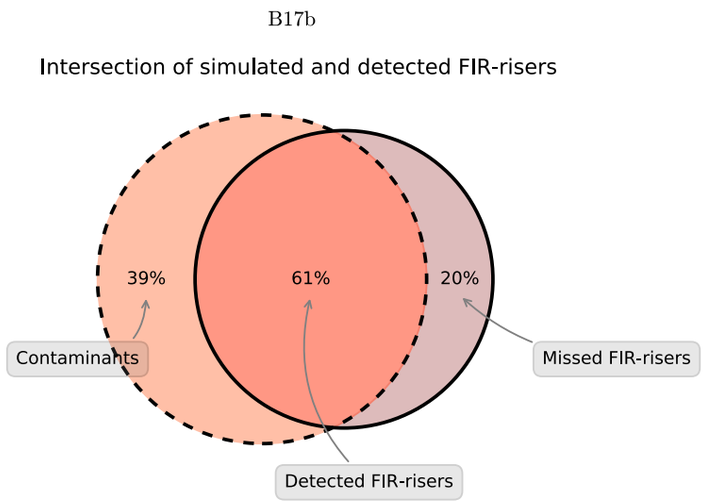
vs. models

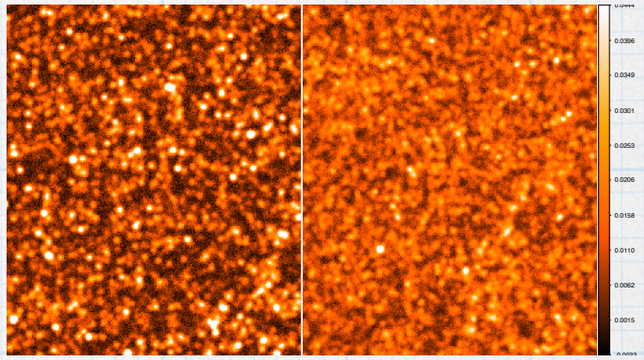


Simulations

Investigation of selection effects





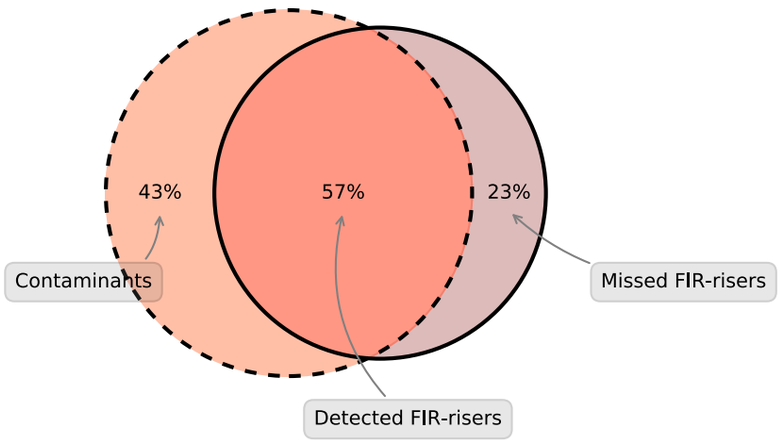


Simulations

Investigation of selection effects

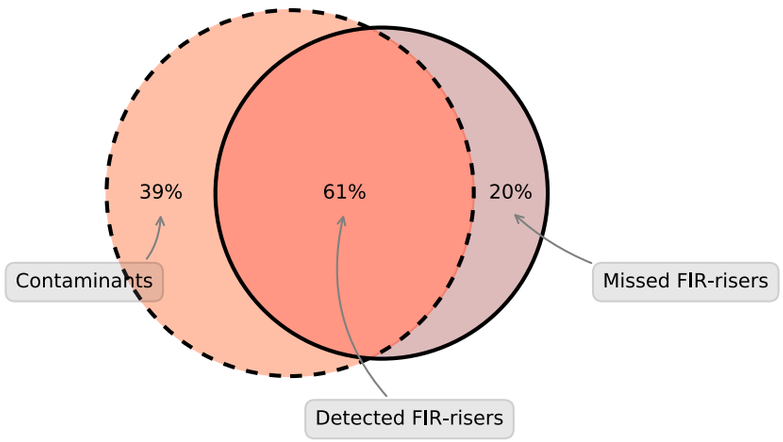
S16

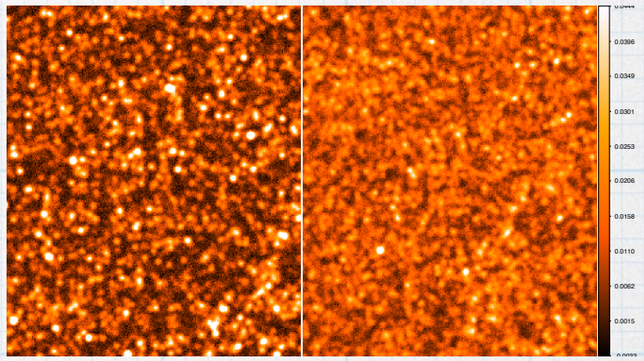
Intersection of simulated and detected FIR-risers

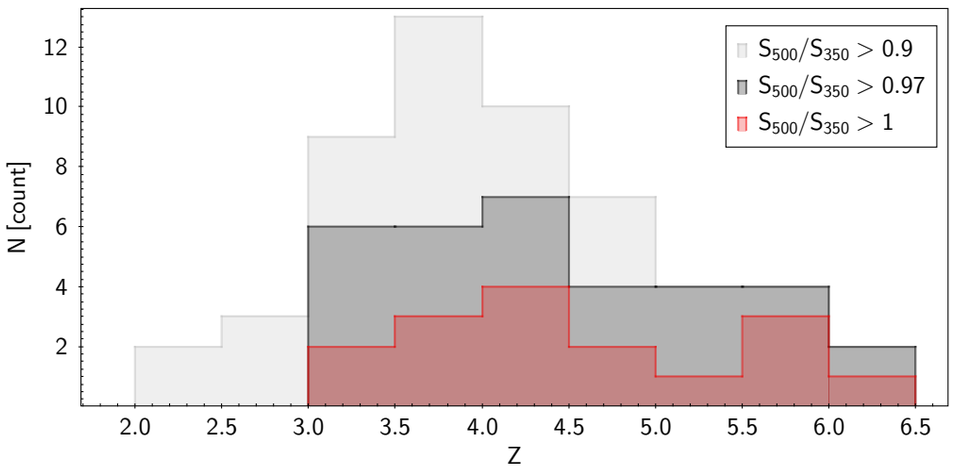


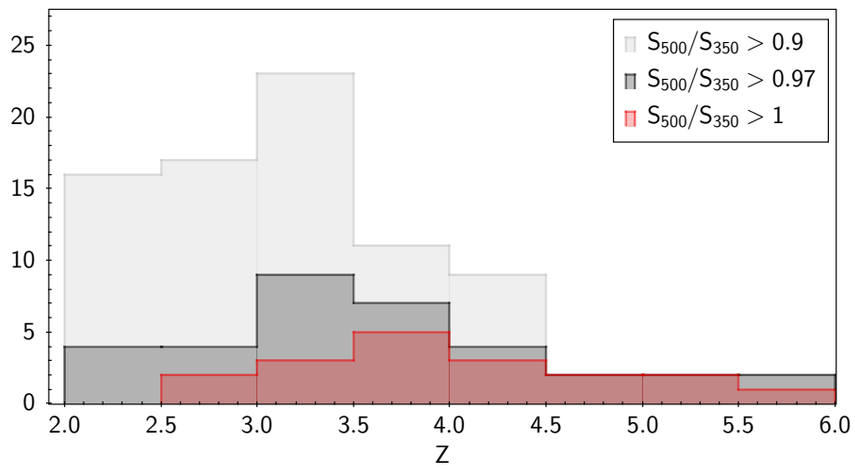
B17b

Intersection of simulated and detected FIR-risers



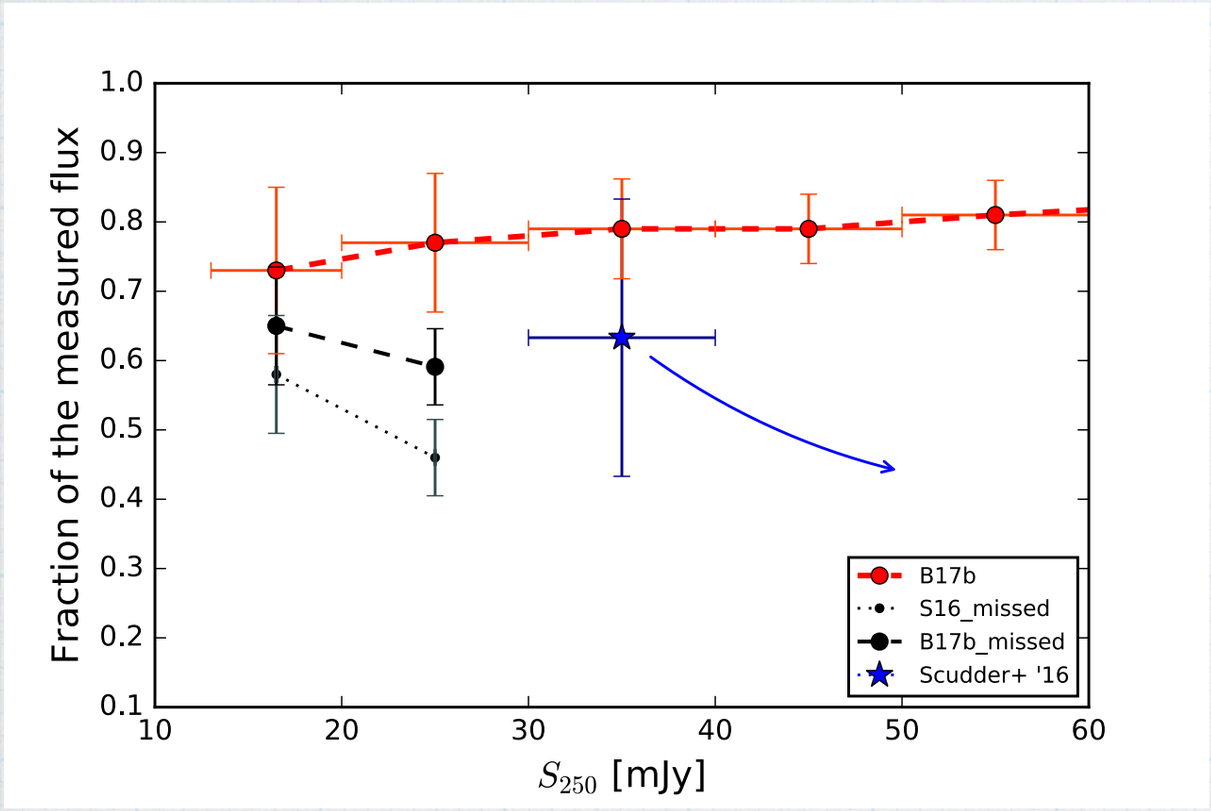






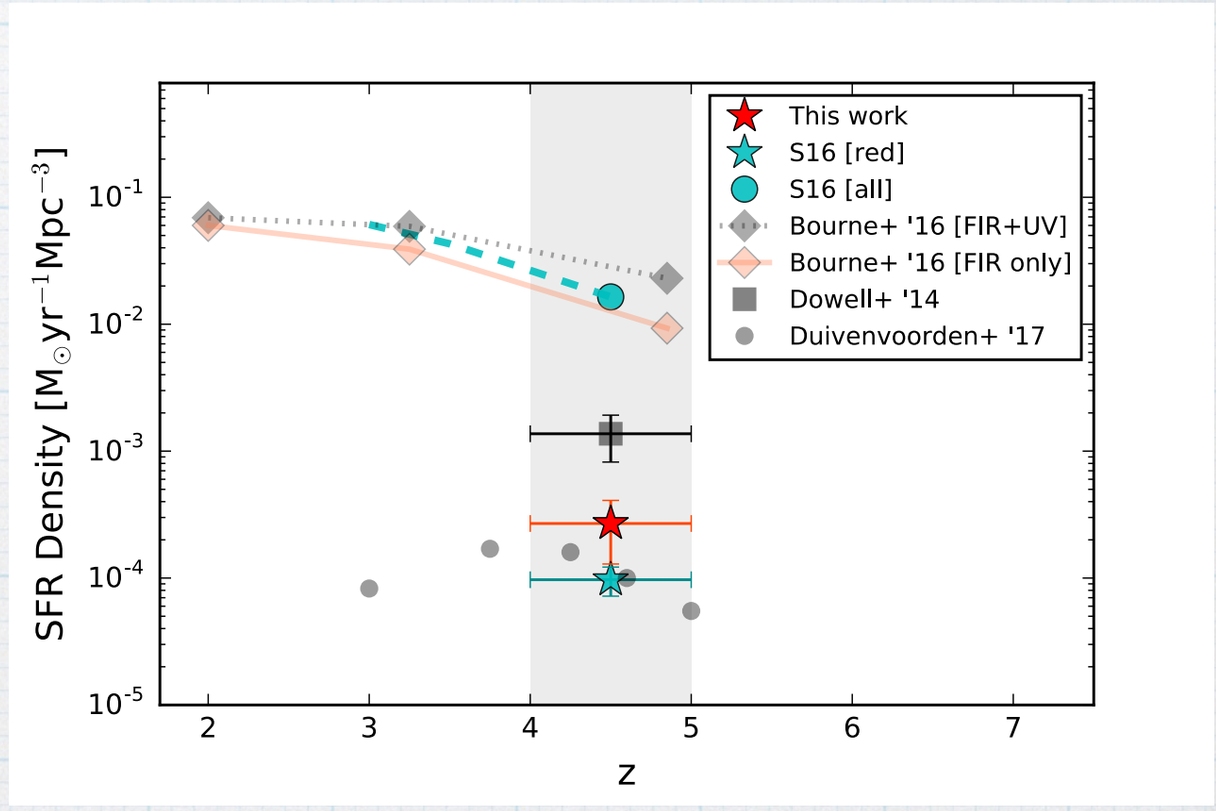
Problem of multiplicity

Resolution effects reduced when SED fitting and source extraction are combined in the same procedure



Star formation rate density?

Maximum contribution up to 1.5% !
Rare subpopulation of sources, mergers?



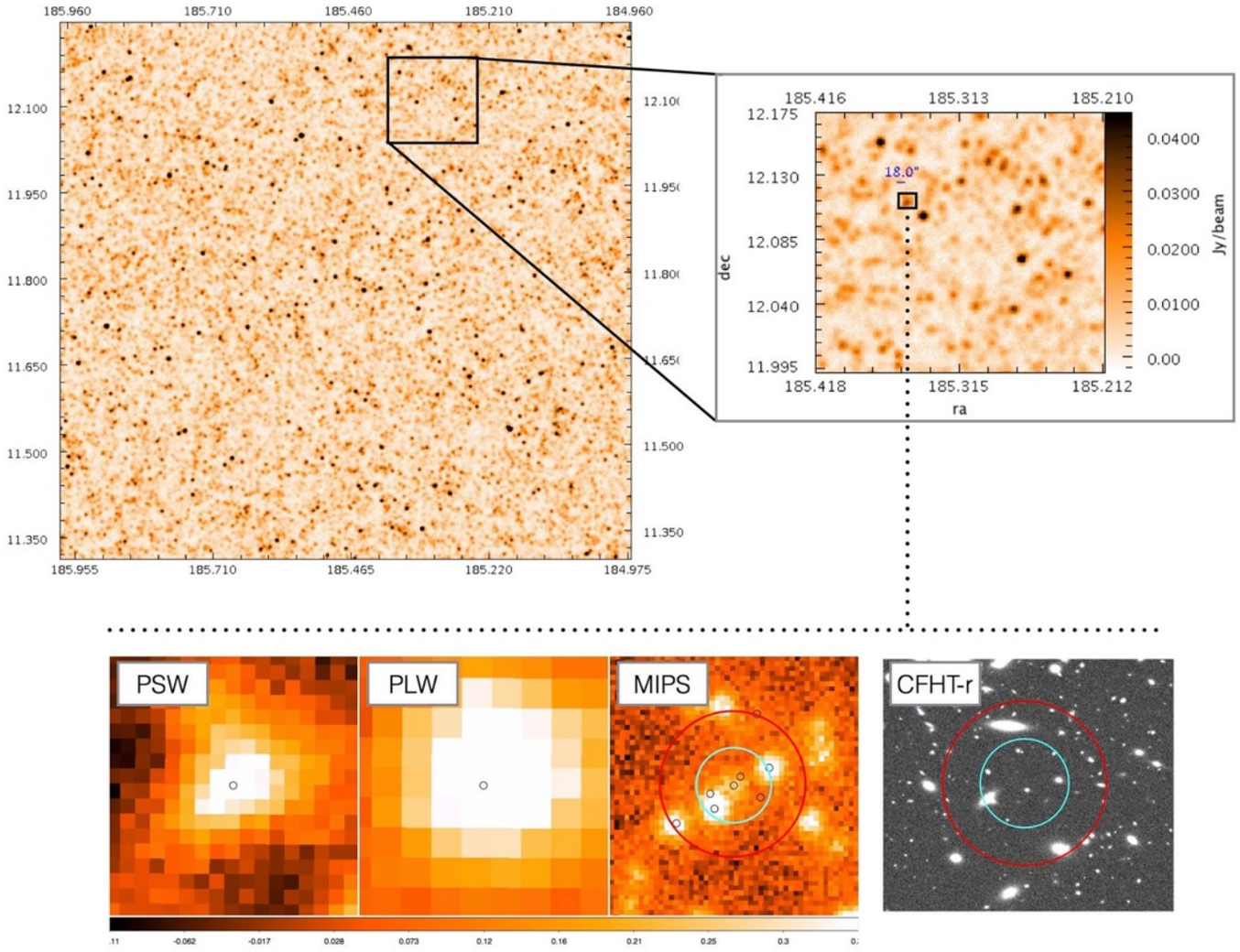
FUTURE PROSPECTS:

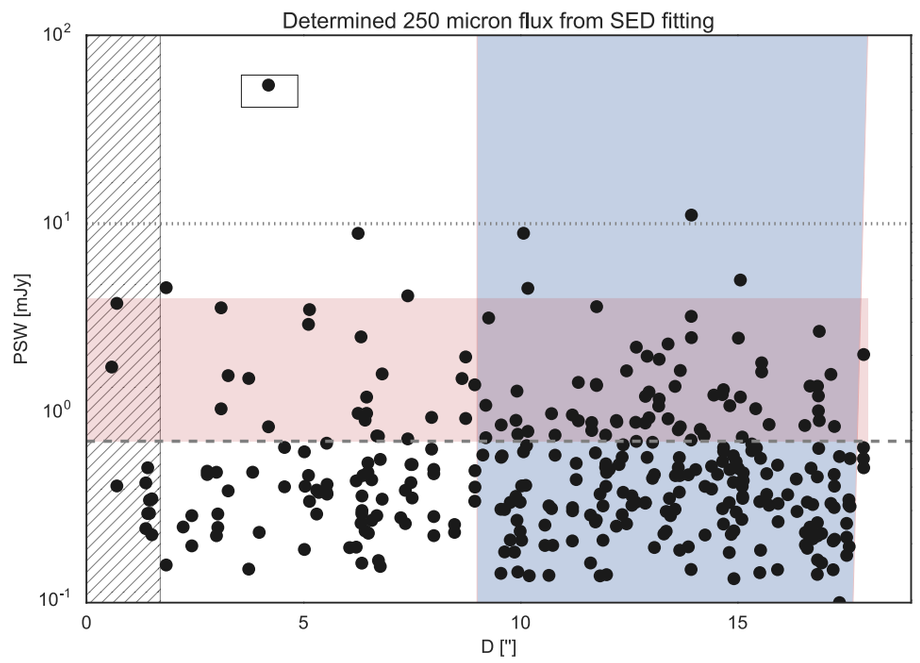
- **FIR-risers/SPIRE selection**

1. ***Testing a new selection criteria in the futureL-z***
2. ***Noise, clustering and weak lensing*** effects must be refined and included in future simulations
3. ***Theoretical modelling of the evolution of FIR-radio(submm) correlation at high-z:*** way to see how to break Tdust-z degeneracy for z>4 sources.

- **Resolving the emission of 1<z<2 sources**

4. *SED fitting of NGVS+PACS data +simulations (in progress)*


185.960
185.710
185.460
185.210
184.960
12.100
11.950
11.800
11.650
11.500
11.350
185.955
185.710
185.465
185.220
184.975
185.416
185.313
185.210
12.175
12.130
12.085
12.040
11.995
18.0"
dec
ra
185.418
185.315
185.212
0.0400
0.0300
0.0200
0.0100
0.00
Jy/beam
PSW
PLW
MIPS
CFHT-r


Determined 250 micron flux from SED fitting
PSW [mJy]
D ["]
10^2
10^1
10^0
10^{-1}
0
5
10
15