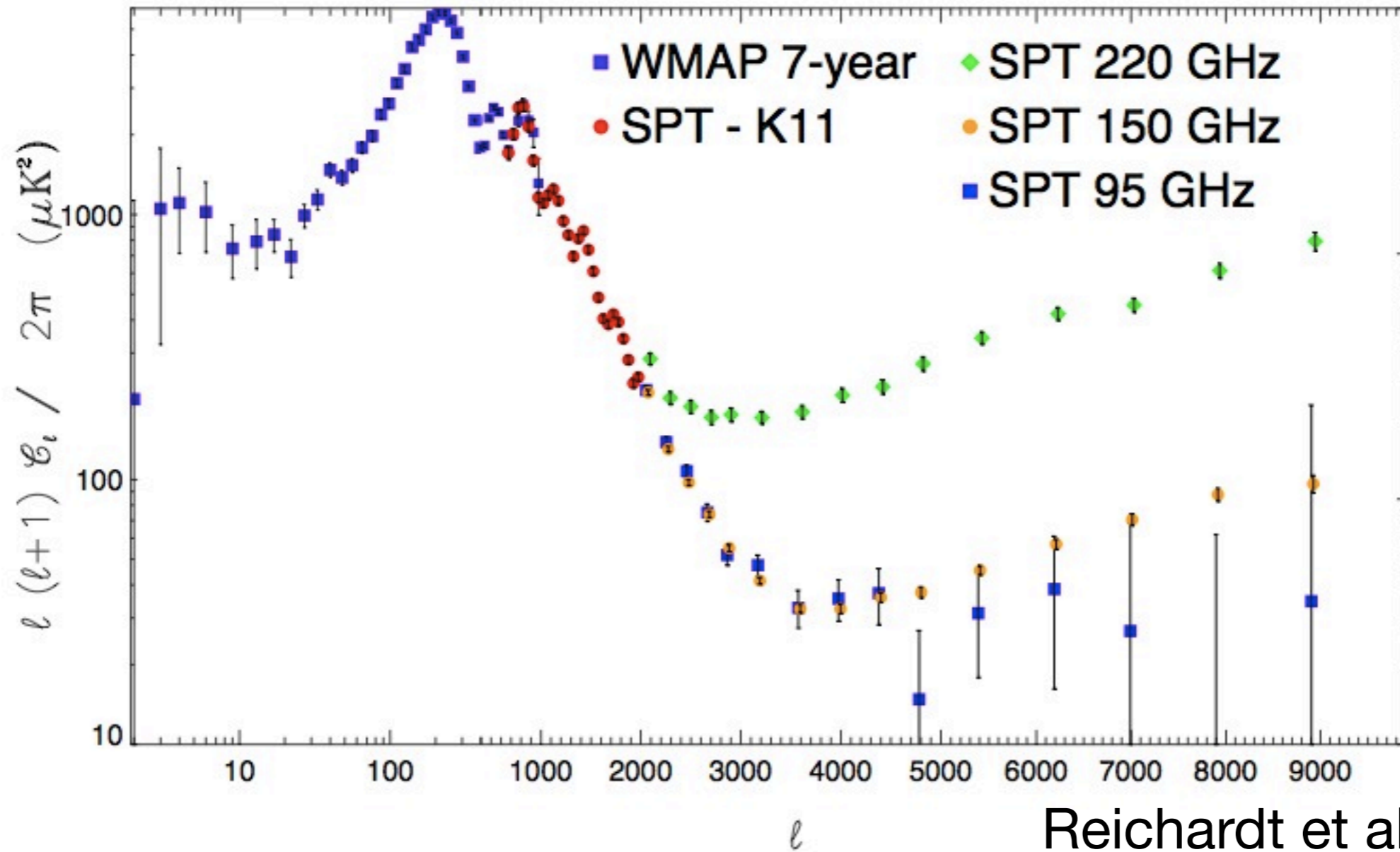


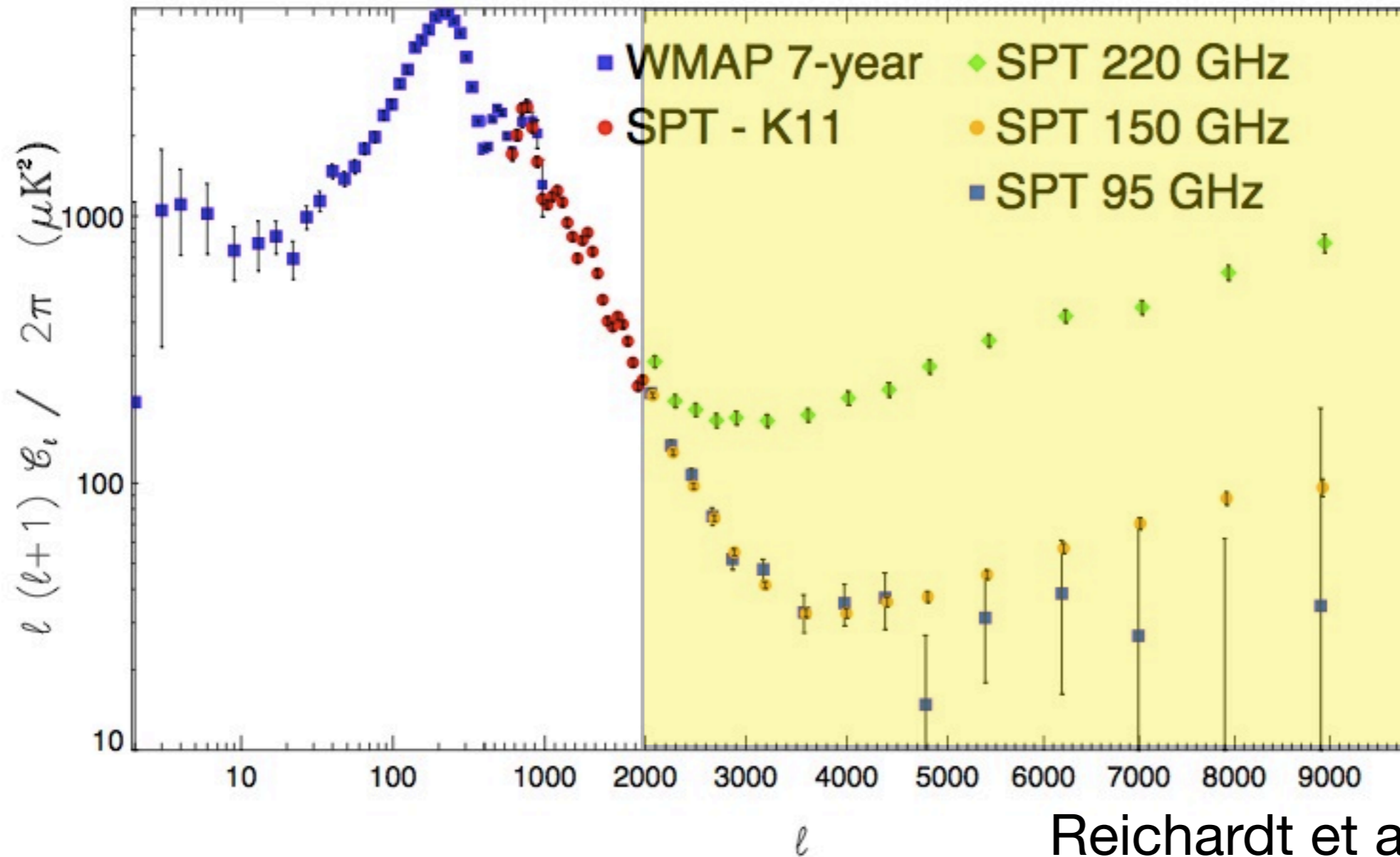
CIB Fluctuations from

$l \sim 400 - 40,000$

Marco Viero - Caltech



motivation

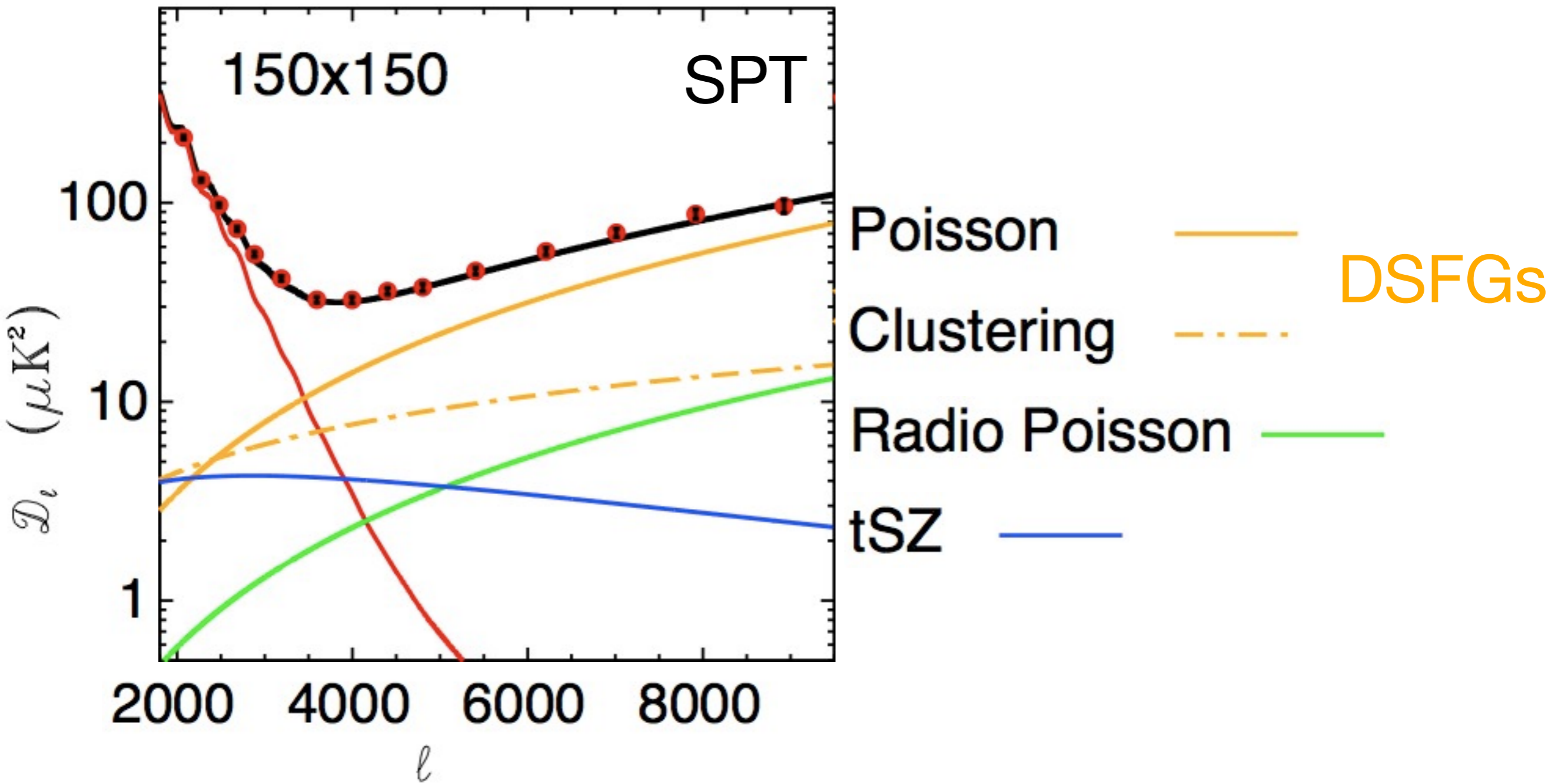


Reichardt et al. 2011

- $\ell > 2000$  dominated by secondary anisotropies

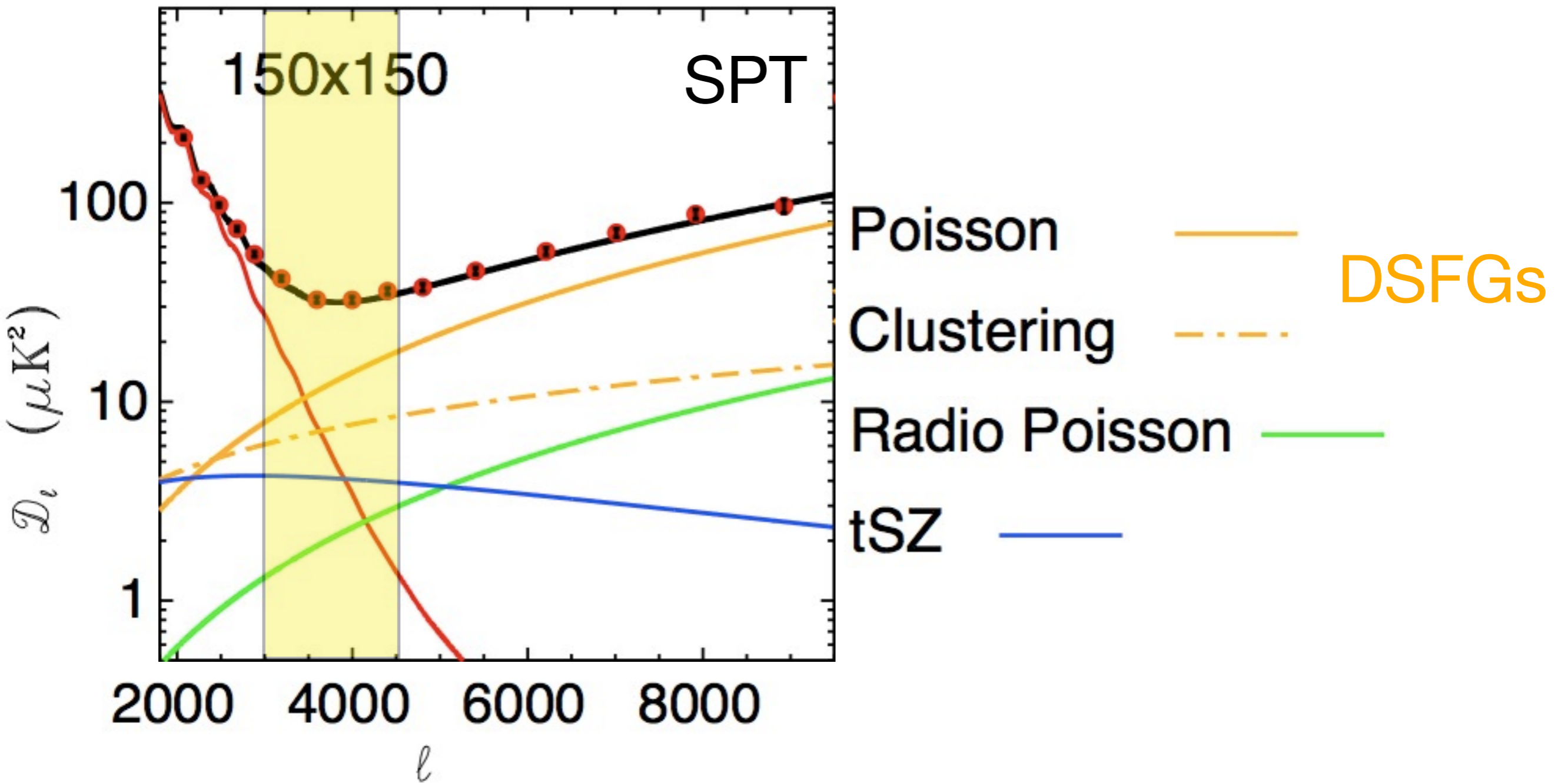
# motivation





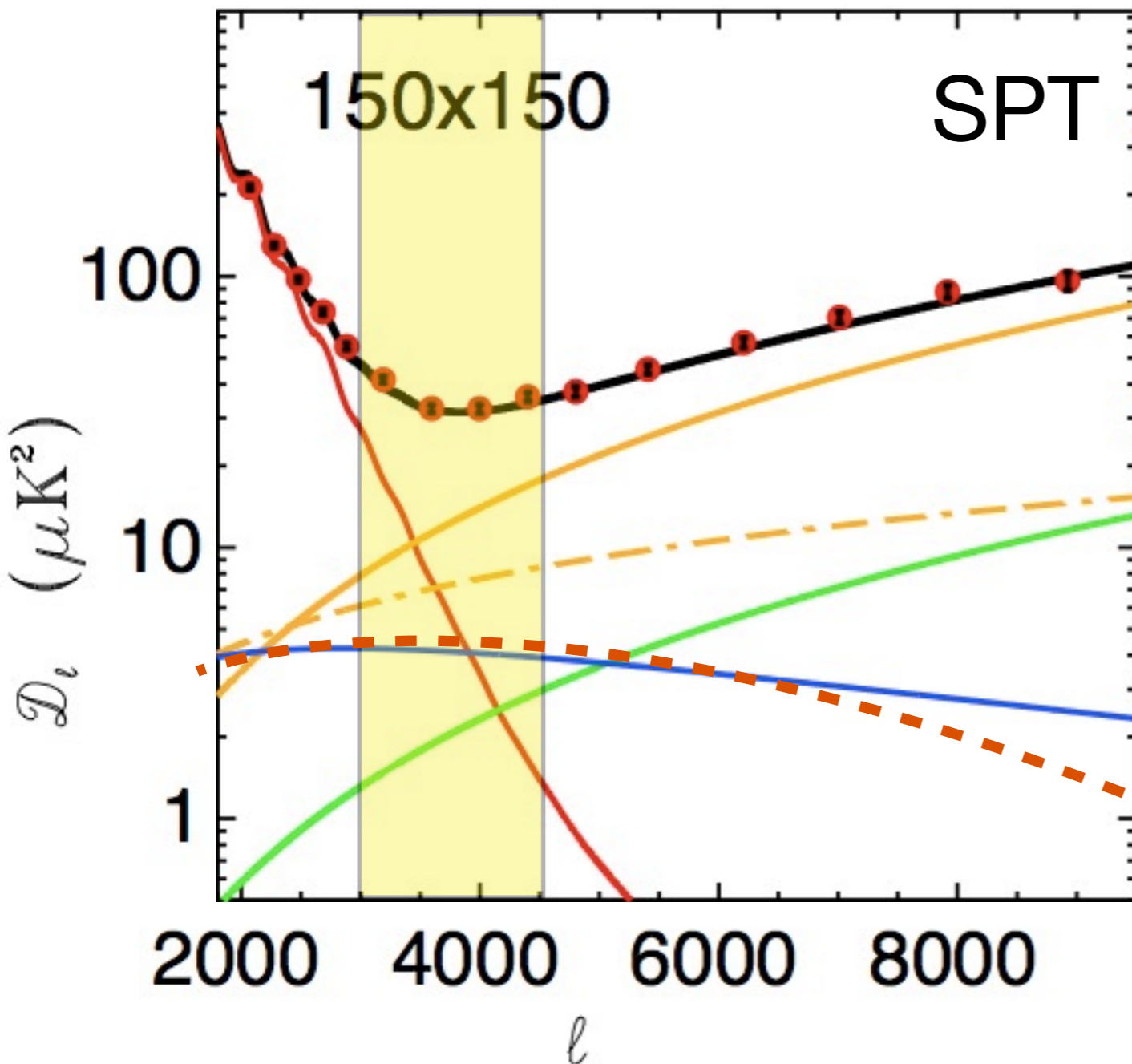
Reichardt et al. 2011

motivation (i)

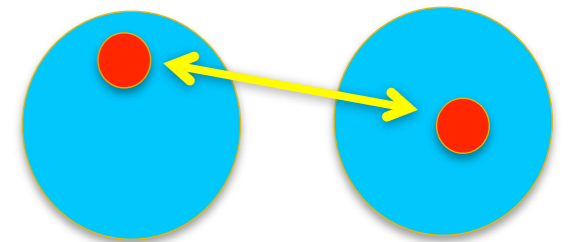


Reichardt et al. 2011

motivation (i)

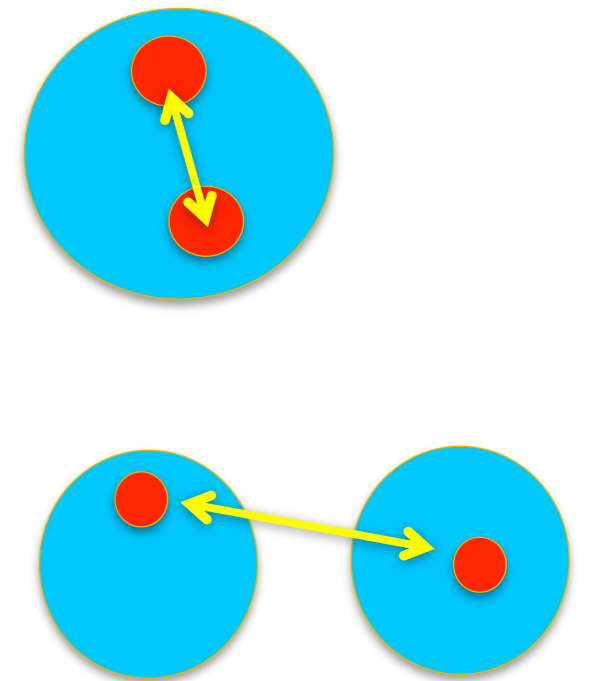
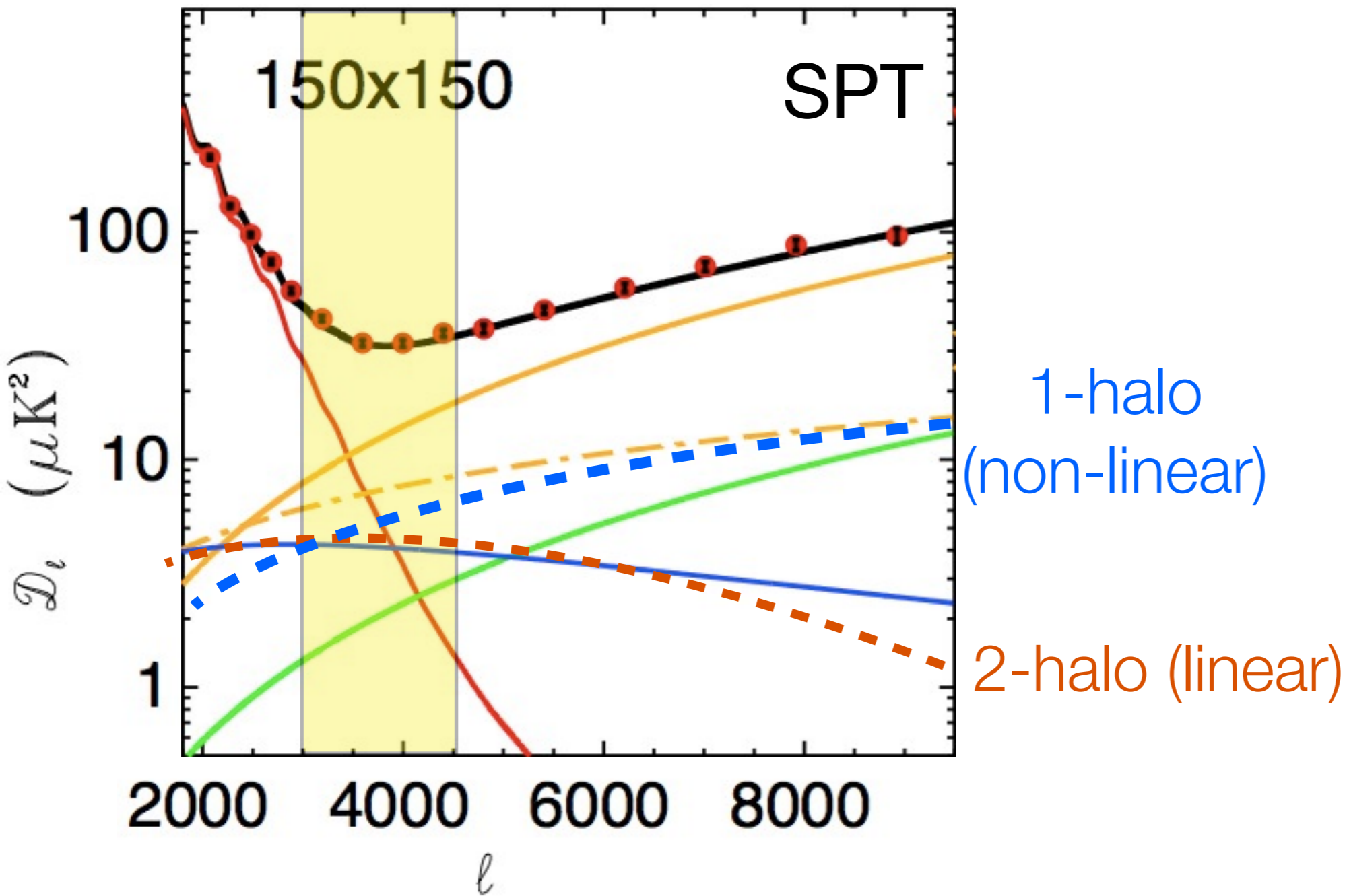


2-halo (linear)



Reichardt et al. 2011

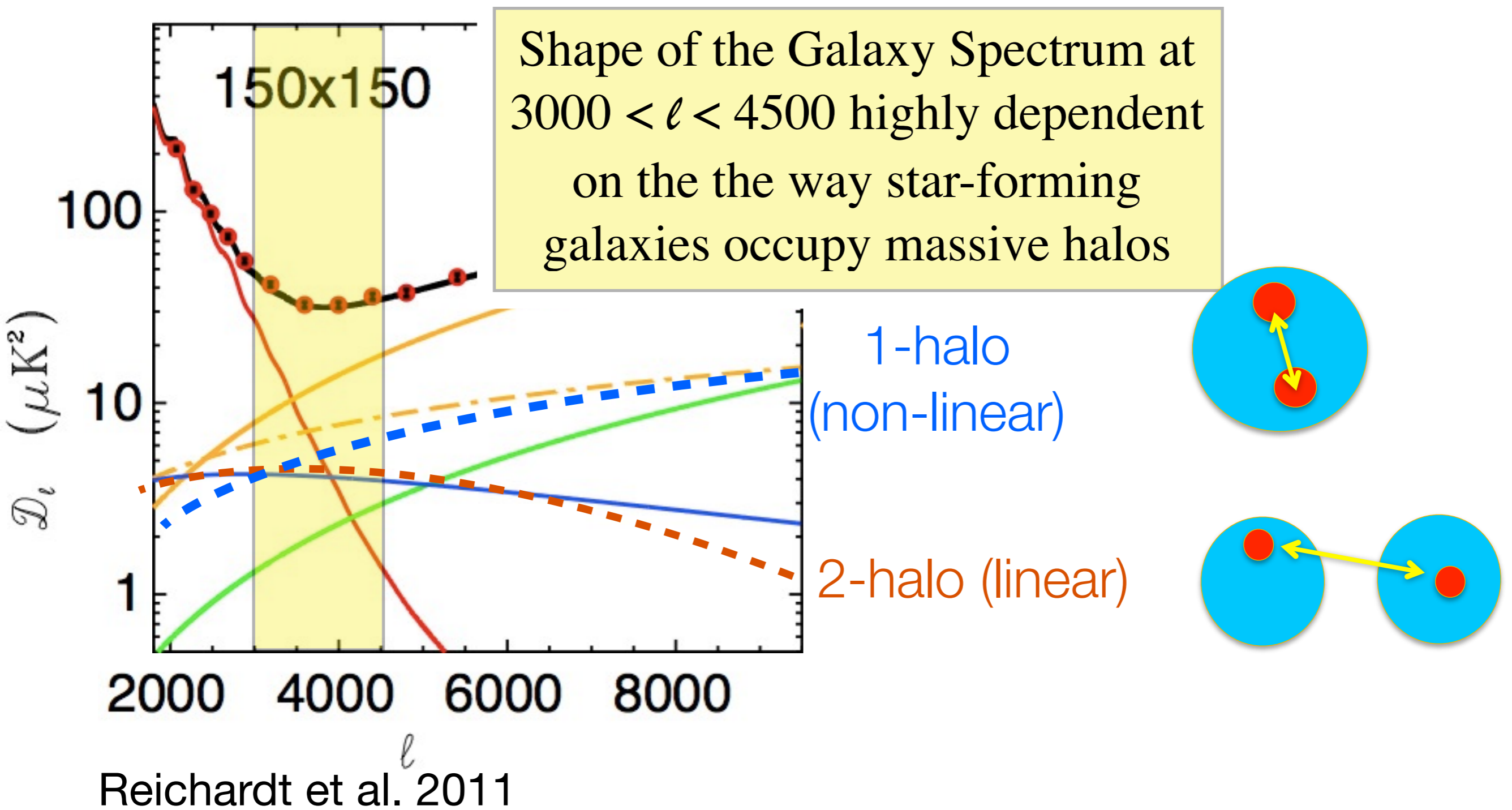
motivation (i)



Reichardt et al. 2011

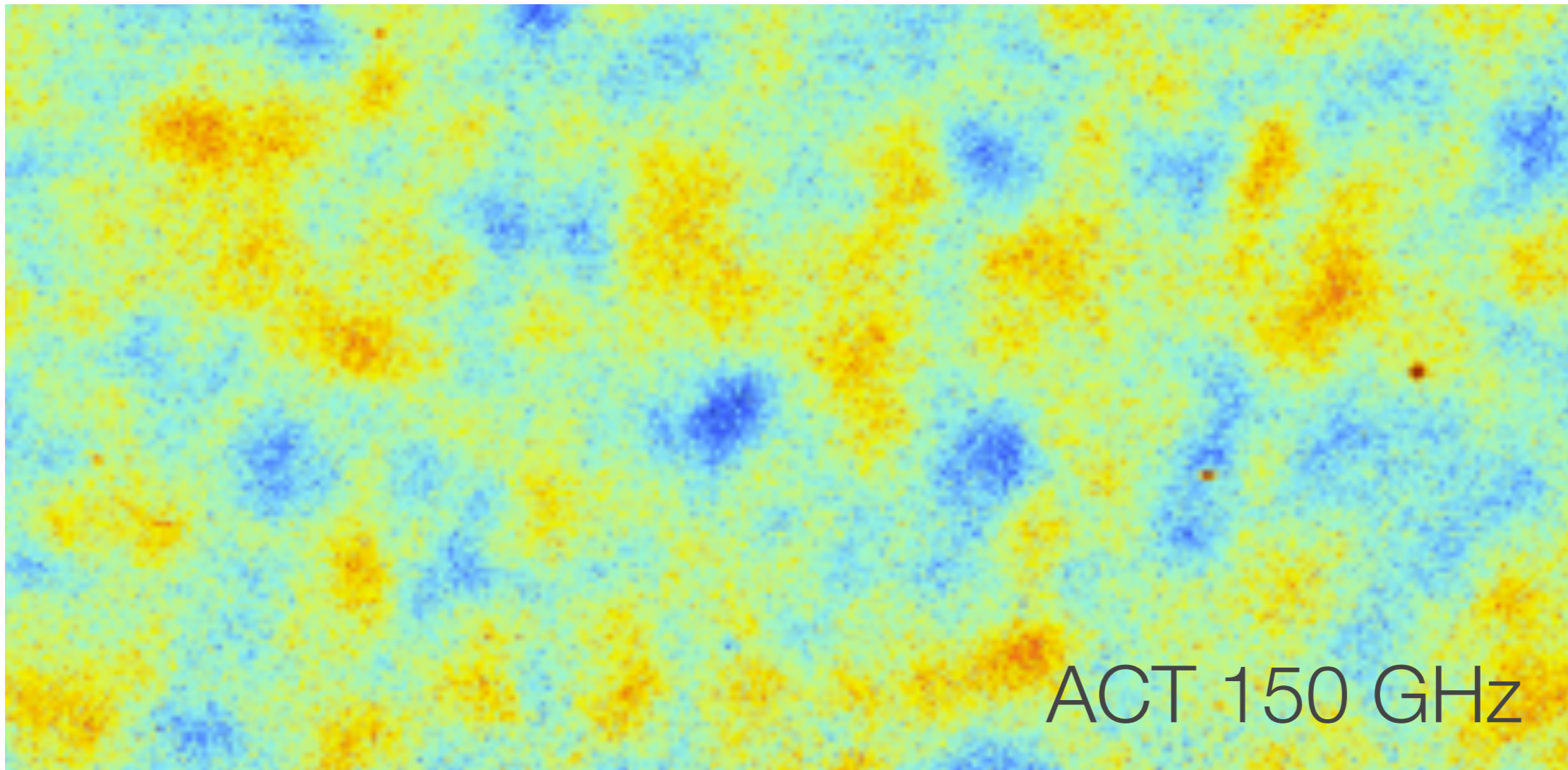
motivation (i)





motivation (i)



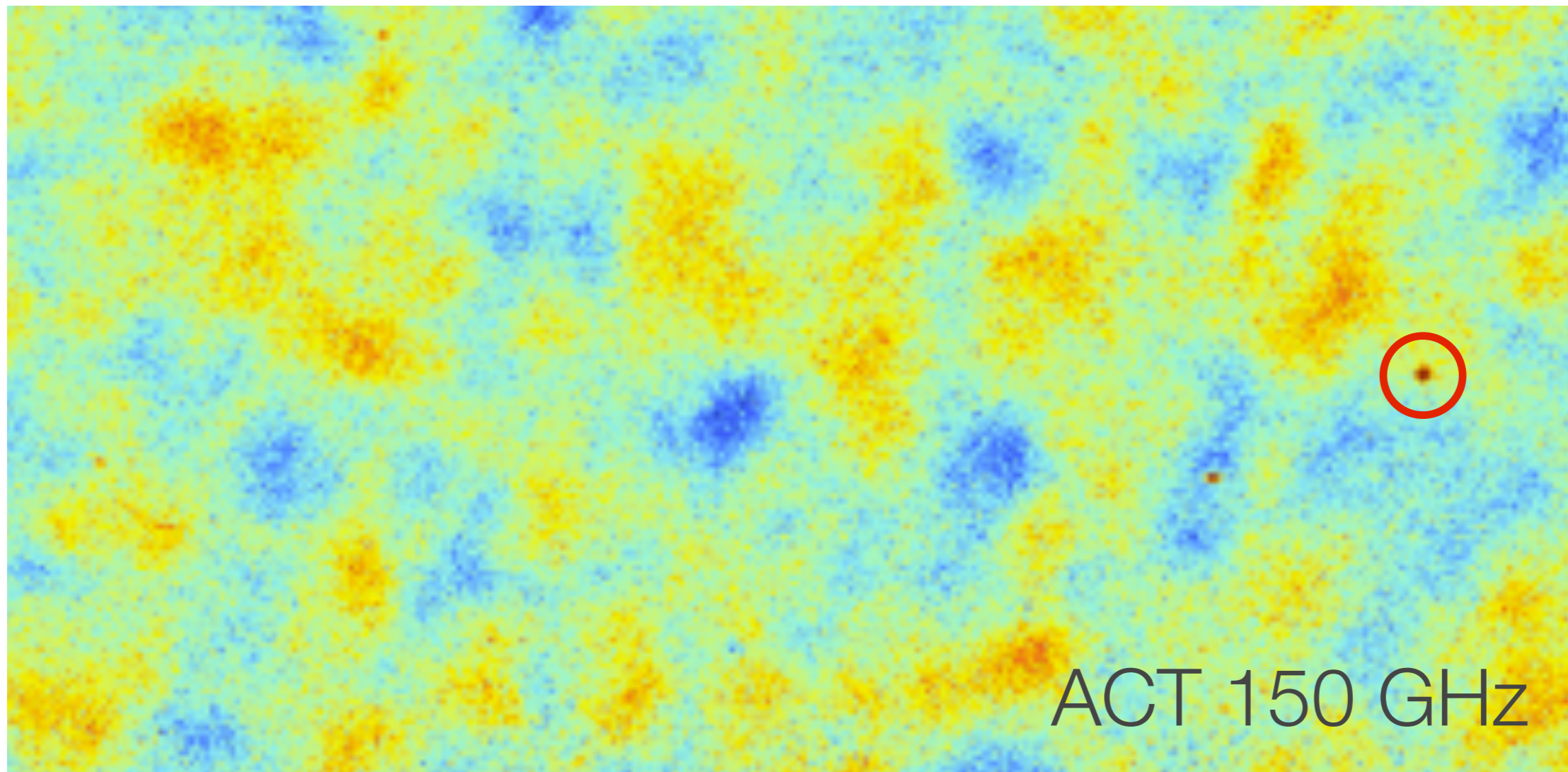


ACT 150 GHz

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motivation (ii)

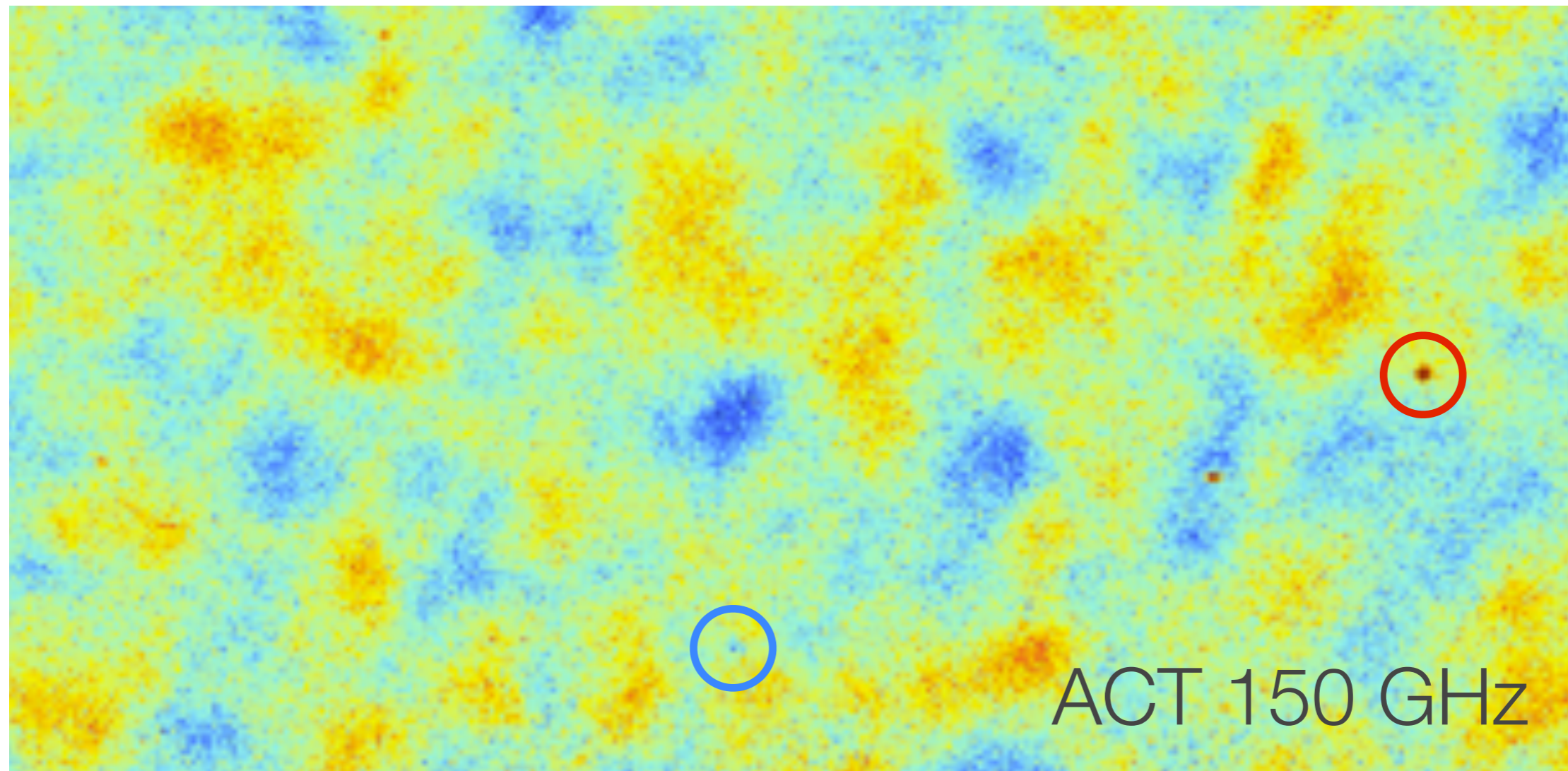




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motivation (ii)

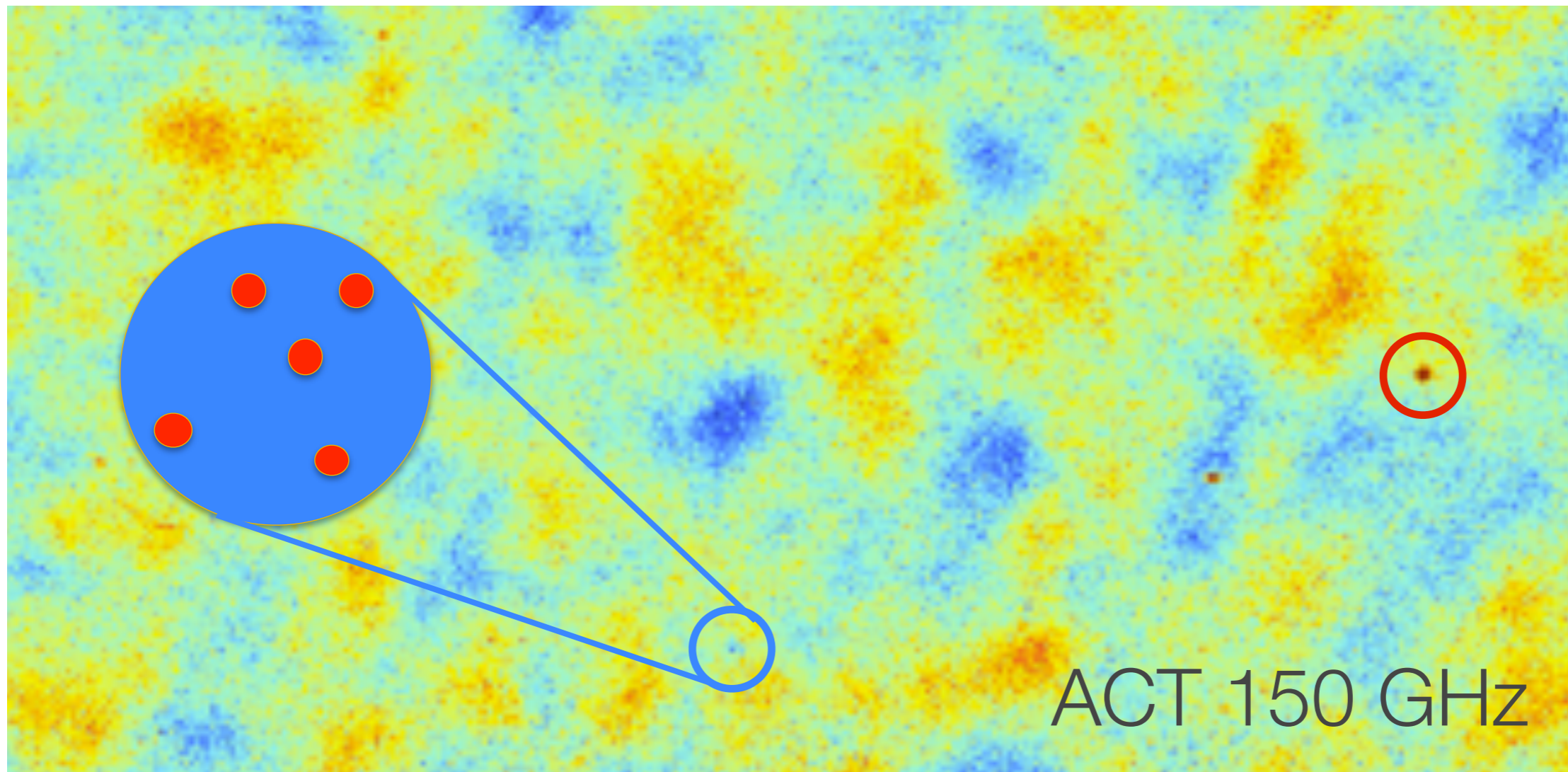




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motivation (ii)



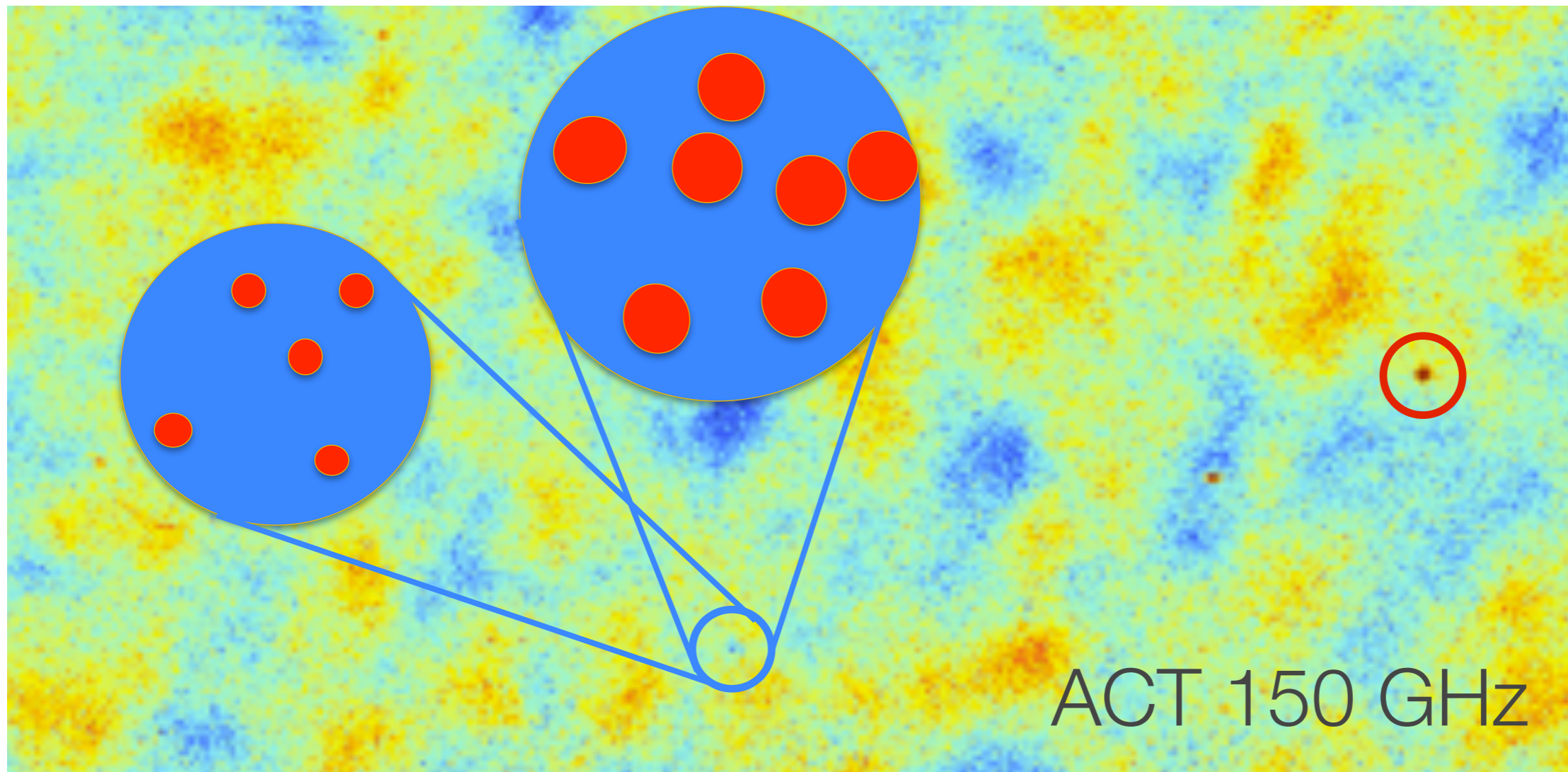


- Halo Occupation Distribution (HOD):
  - How many satellites per given halo mass?

---

motivation (ii)



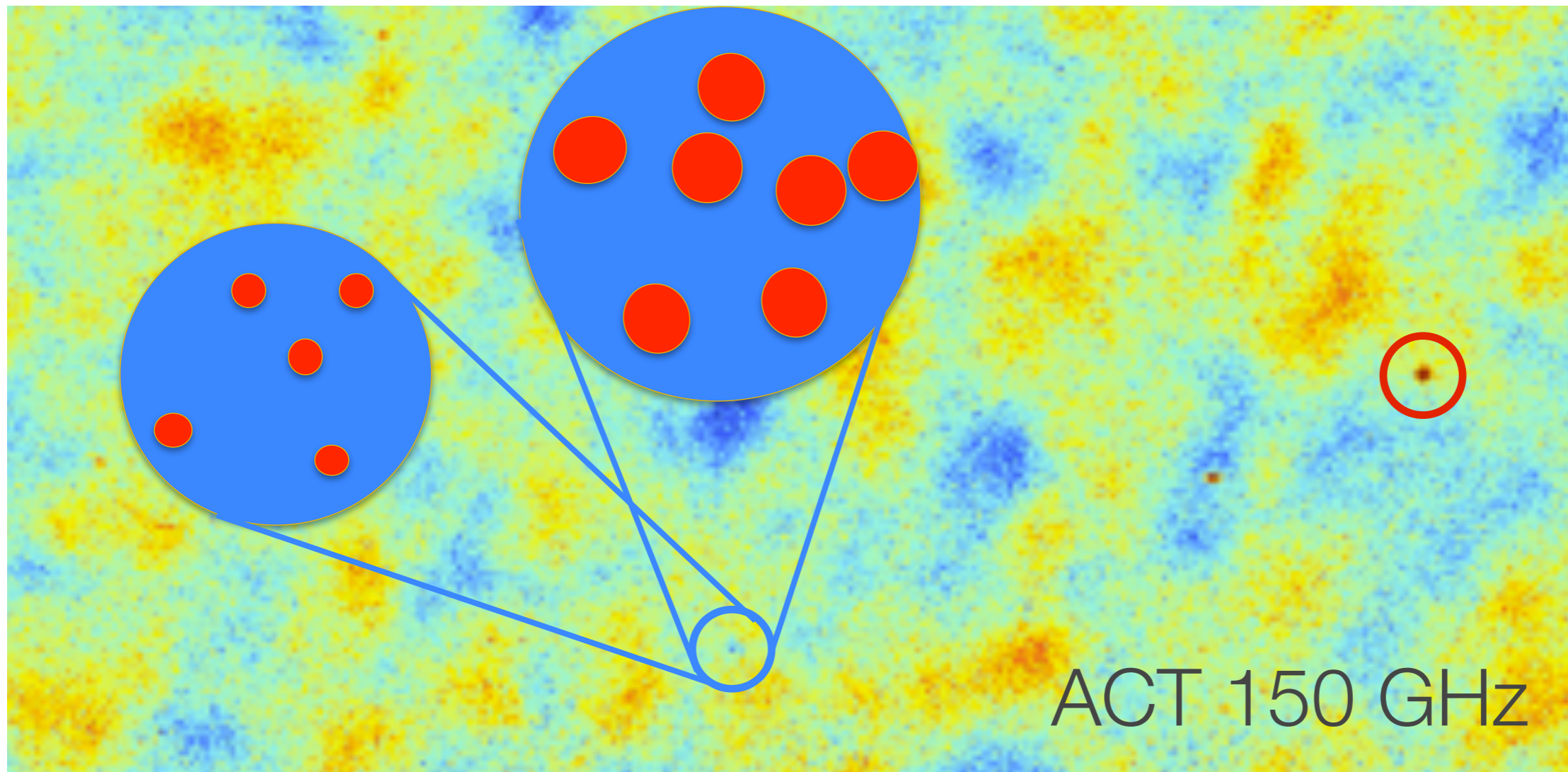


- Halo Occupation Distribution (HOD):
  - How many satellites per given halo mass?
  - Luminosity-Mass relation?

---

# motivation (ii)





- Halo Occupation Distribution (HOD):
  - How many satellites per given halo mass?
  - Luminosity-Mass relation?
- This is imprinted on the 1-halo term of the CIB power spectrum!

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# motivation (ii)



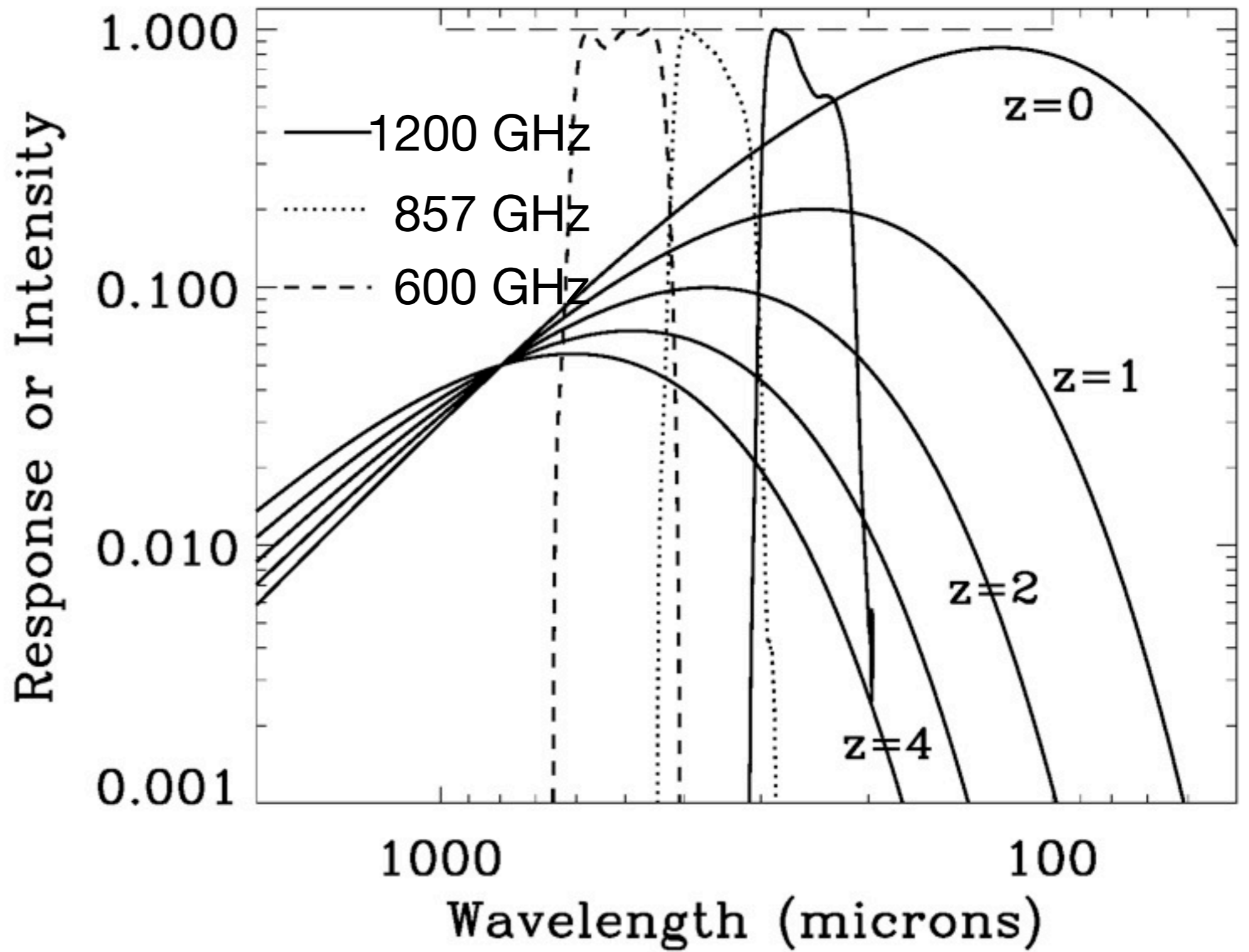
# The Team

Bruno Altieri, Alex Amblard, Rick Arendt, **Vinod Arumugam**, Robbie Auld, Herve Aussel, Alexandre Beelen, Andrew Blain, Jamie Bock, Alessandro Boselli, **Carrie Bridge**, **Drew Brisbin**, Veronique Buat, Denis Burgarella, **Nieves Castro-Rodriguez**, Antonia Cava, Pierre Chanial, Ed Chapin, Michele Cirasuolo, Dave Clements, **Alex Conley**, Luca Conversi, Asantha Cooray, Emanuele Daddi, Gianfranco De Zotti, Darren Dowell, Jim Dunlop, Eli Dwek, **Simon Dye**, Steve Eales, David Elbaz, Erica Ellingson, **Tim Ellsworth-Bowers**, Duncan Farrah, **Patrizia Ferrero**, **Mark Frost**, Ken Ganga, **Elodie Giovannoli**, Jason Glenn, **Eduardo Gonzalez-Solares**, Matt Griffin, Mark Halpern, Martin Harwit, **Evanthia Hatziminaoglou**, George Helou, Jiasheng Huang, Ho Seong Hwang, Edo Ibar, Olivier Ilbert, Kate Isaak, Rob Ivison, Martin Kunz, Guilaine Lagache, Glenn Laurent, Louis Levenson, Carol Lonsdale, Nanyao Lu, Suzanne Madden, Bruno Maffei, **Georgios Magdis**, **Gabriele Mainetti**, **Lucia Marchetti**, Gaelen Marsden, Jason Marshall, Glenn Morrison, Angela Mortier, Hien Trong Nguyen, Brian O'Halloran, Seb Oliver, Alain Omont, Francois Orioux, Frazer Owen, Matthew Page, Biswajit Pandey, Maruillo Pannell, Pasquale Panuzzo, Andreas Papageorgiou, **Harsit Patel**, Chris Pearson, Ismael Perez Fournon, Michael Pohlen, Naseem Rangwala, **Jason Rawlings**, **Gwen Raymond**, Dimitra Rigopoulou, **Laurie Riguccini**, Guilia Rodighiero, Isaac Roseboom, Michael Rowan-Robinson, Miguel Sanchez Portal, Bernhard Schulz, Douglas Scott, Paolo Serra, Nick Seymour, David Shupe, Anthony Smith, Jason Stevens, Veronica Strazzu, Myrto Symeonidis, Markos Trichas, **Katherine Tugwell**, Mattia Vaccari, Elisabetta Valiante, Ivan Vatchanov, Joaquin Vieira, **Marco Viero**, Lingyu Wang, Don Wiebe, Kevin Xu, Michael Zemcov

Faculty & Researchers **PostDocs** **PhD Students**

Plus engineers, instrument  
builders, software developers etc.

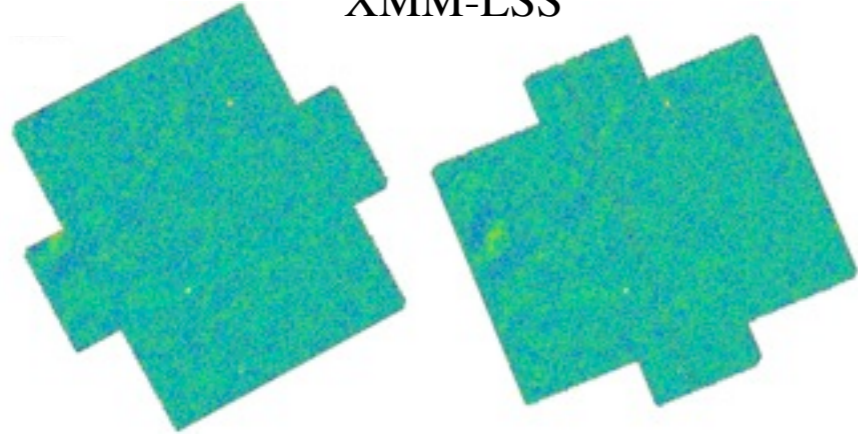




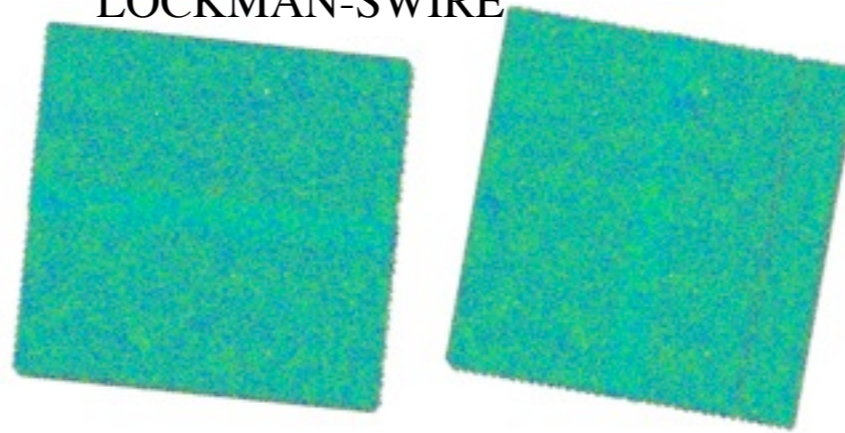
data



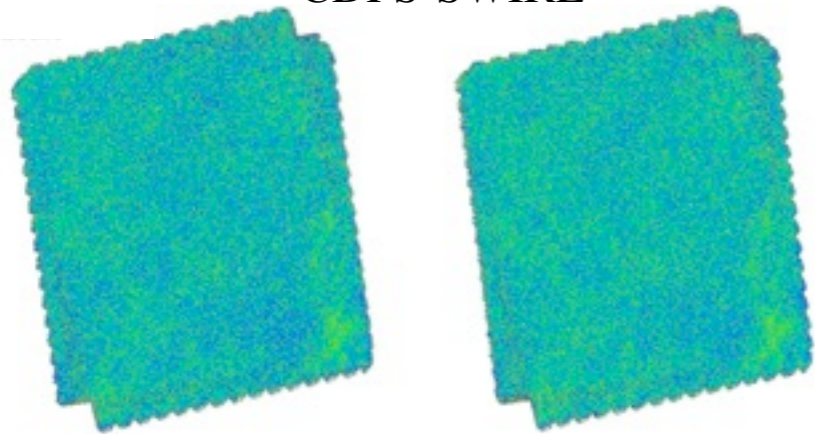
XMM-LSS



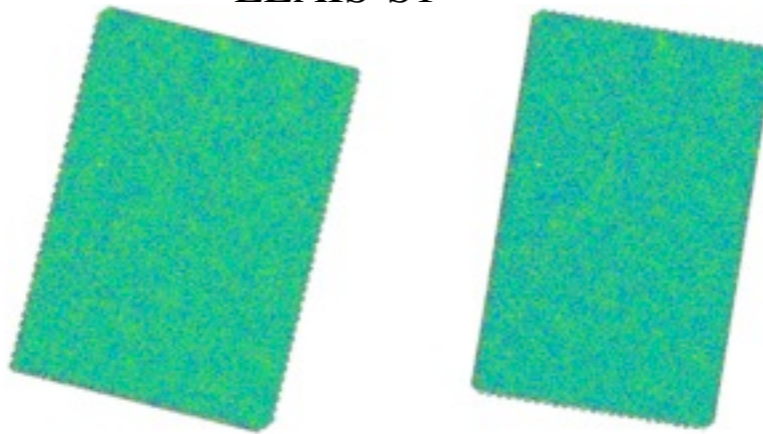
LOCKMAN-SWIRE



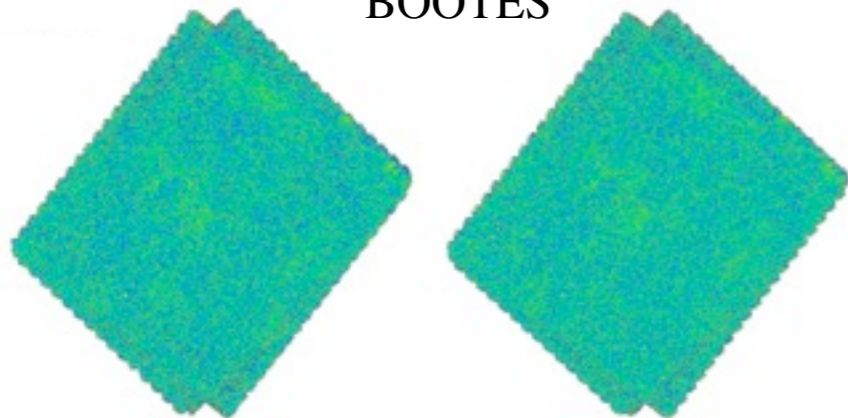
CDFS-SWIRE



ELAIS-S1



BOOTES



**SMAP Team**

Alex Conley

Louis Levenson

Gaelen Marsden

Marco Viero

Mike Zemcov

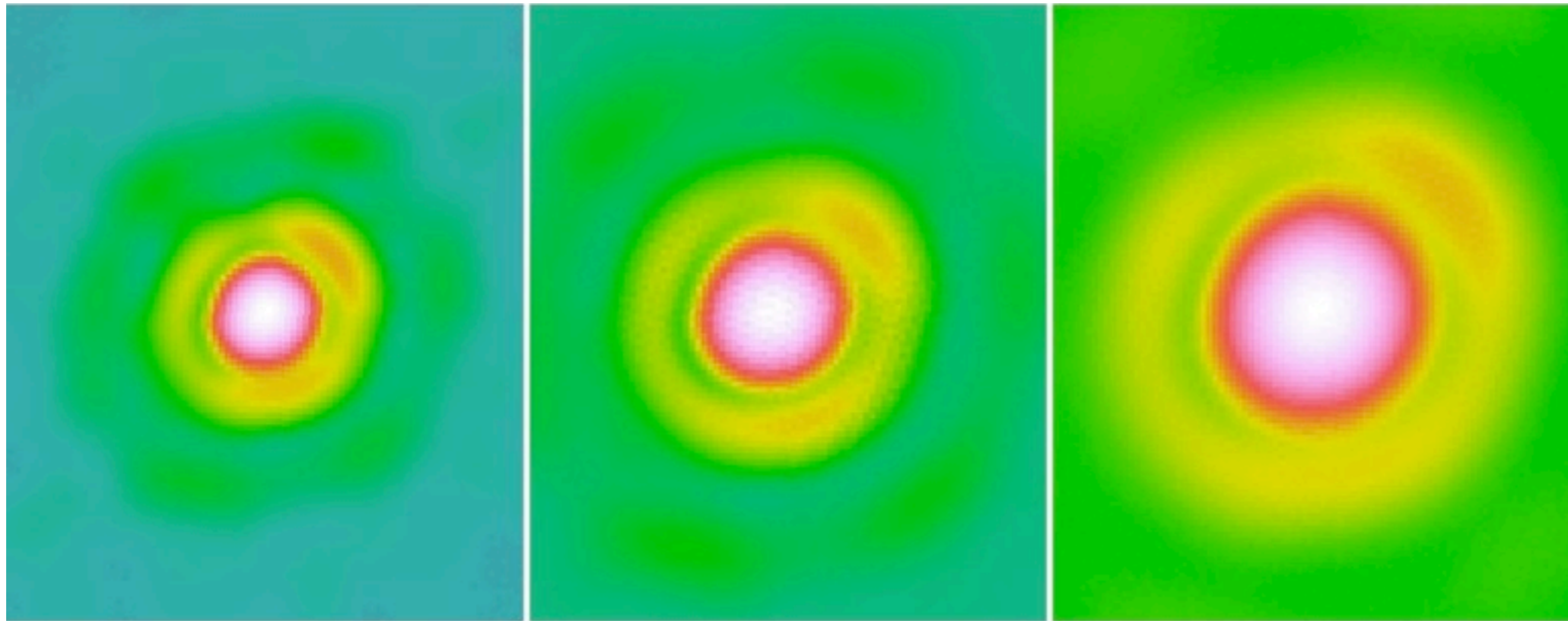
- SPIRE maps at 1200, 857, and 600 GHz
- Maps made with HeRMES SMAP pipeline
- 5 fields totaling  $\sim 70 \text{ deg}^2$
- Modes  $> \sim 0.5 \text{ deg}$  filtered
- Sources  $> 50, 100, 200, 300 \text{ mJy}$  masked

data

250  $\mu\text{m}$   
(1200 GHz)

350  $\mu\text{m}$   
(857 GHz)

500  $\mu\text{m}$   
(600 GHz)



FWHM = 18.2''

25.4''

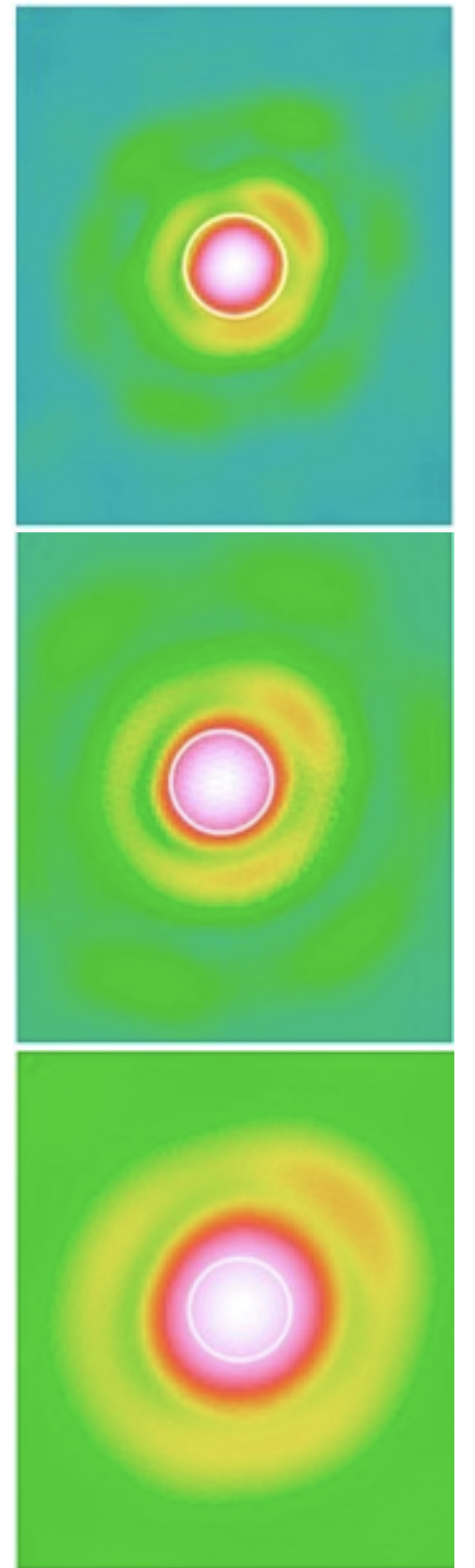
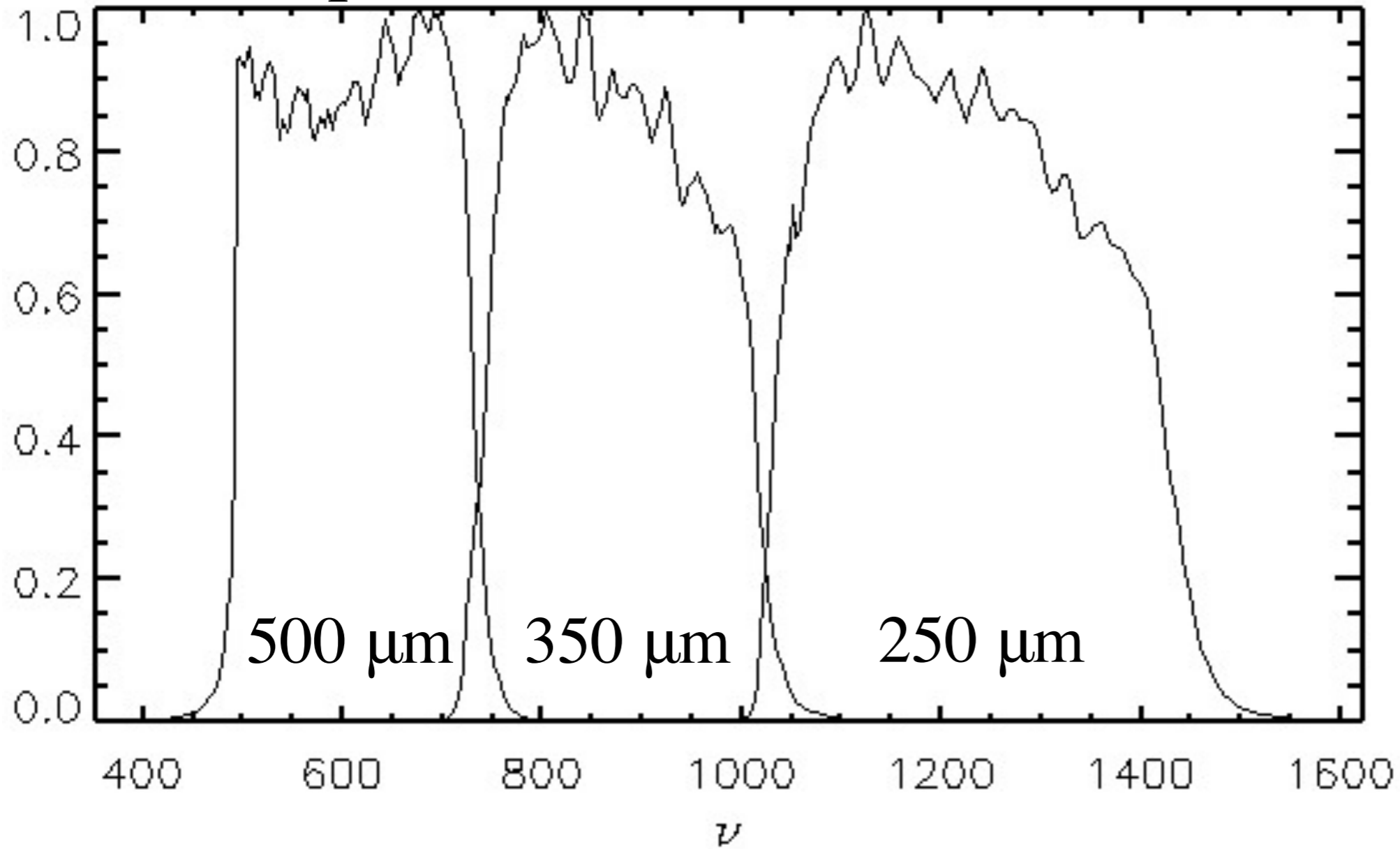
36.6''

- SMAP maps of Neptune

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# calibration

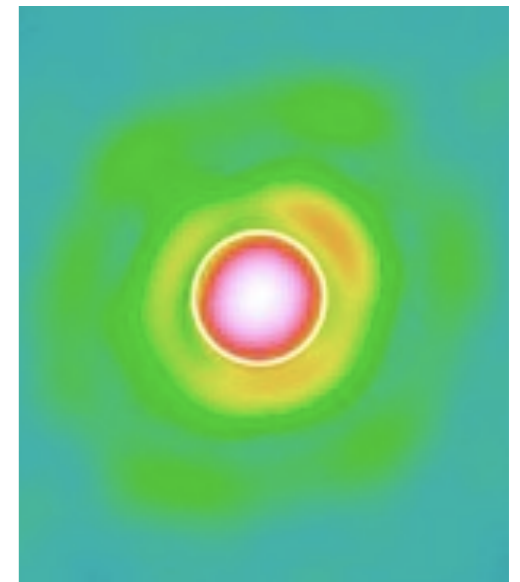
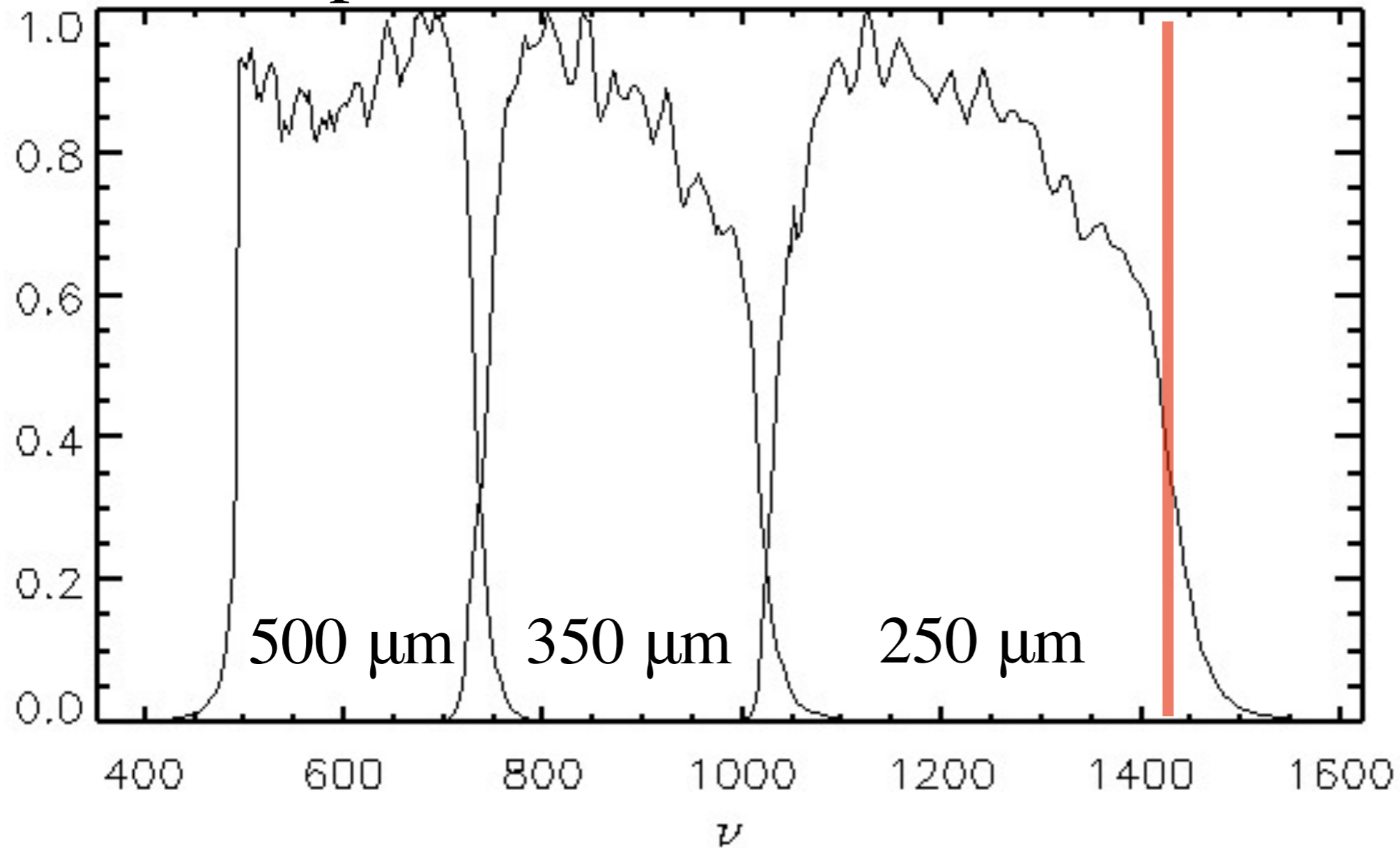
- SPIRE passbands



calibration



- SPIRE passbands

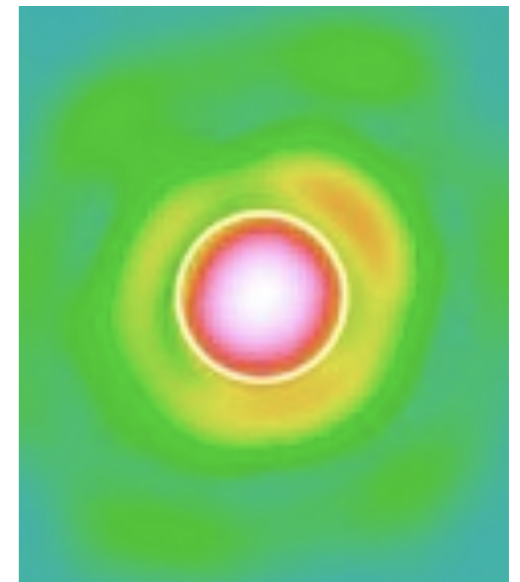
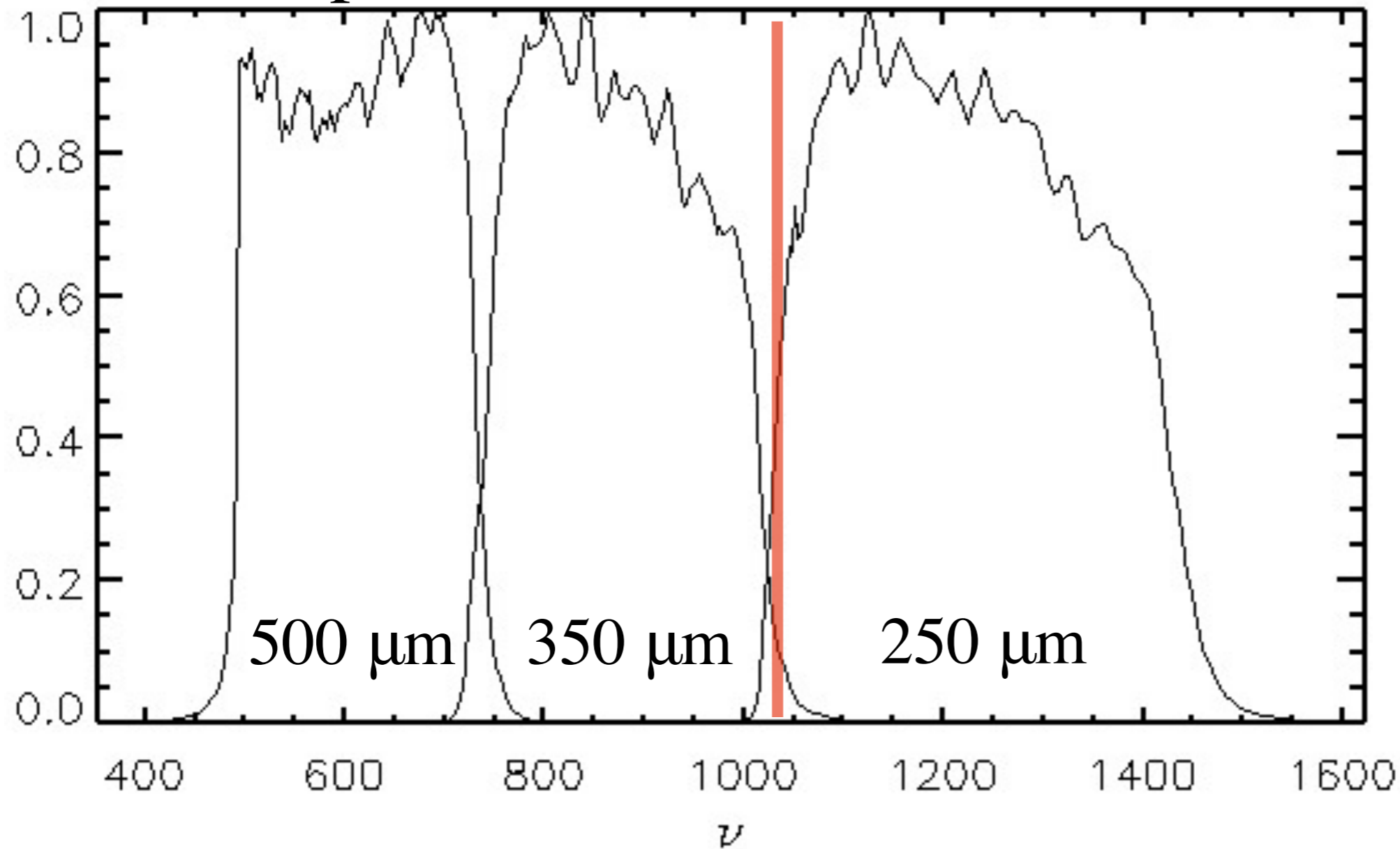


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# calibration

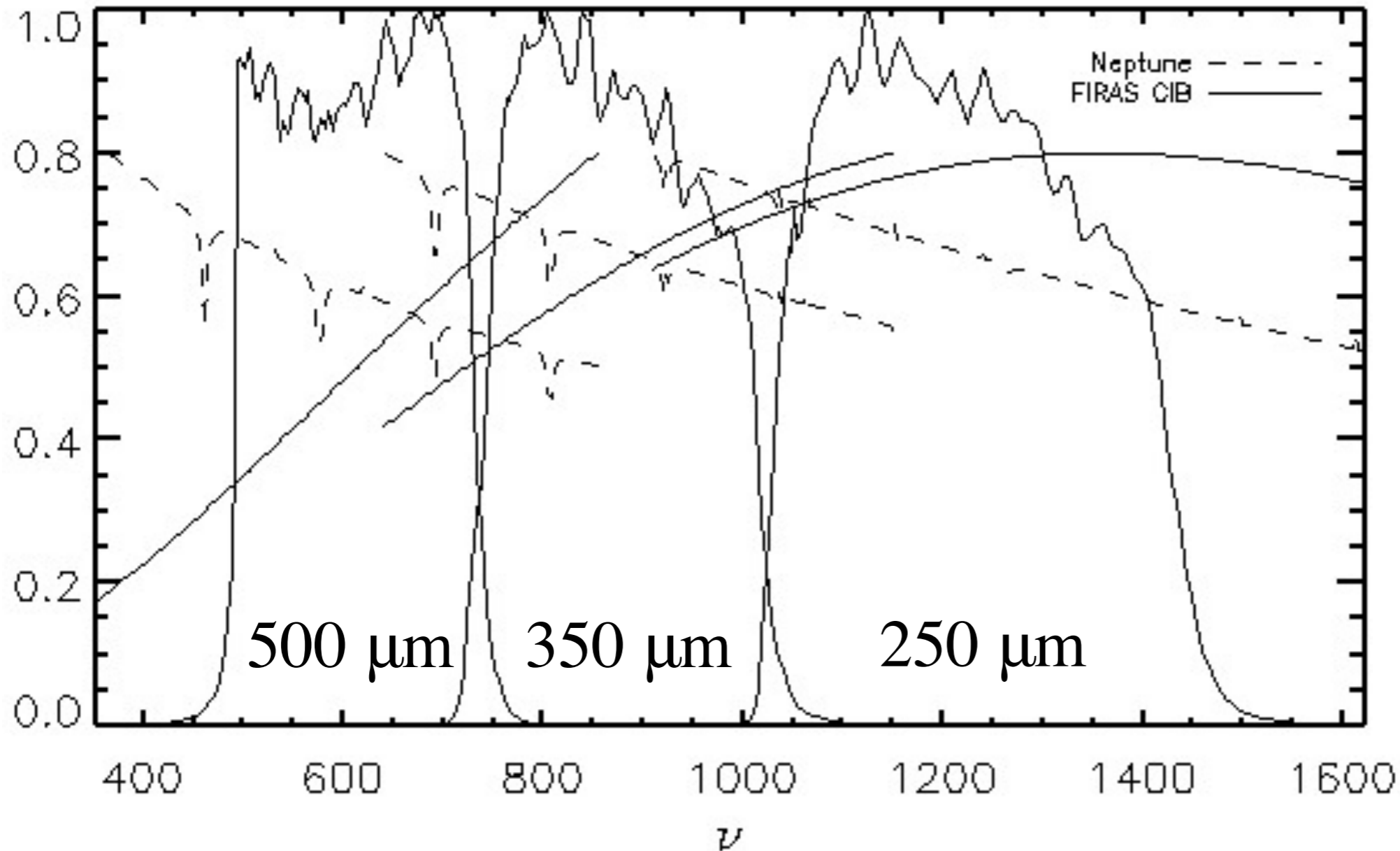


- SPIRE passbands



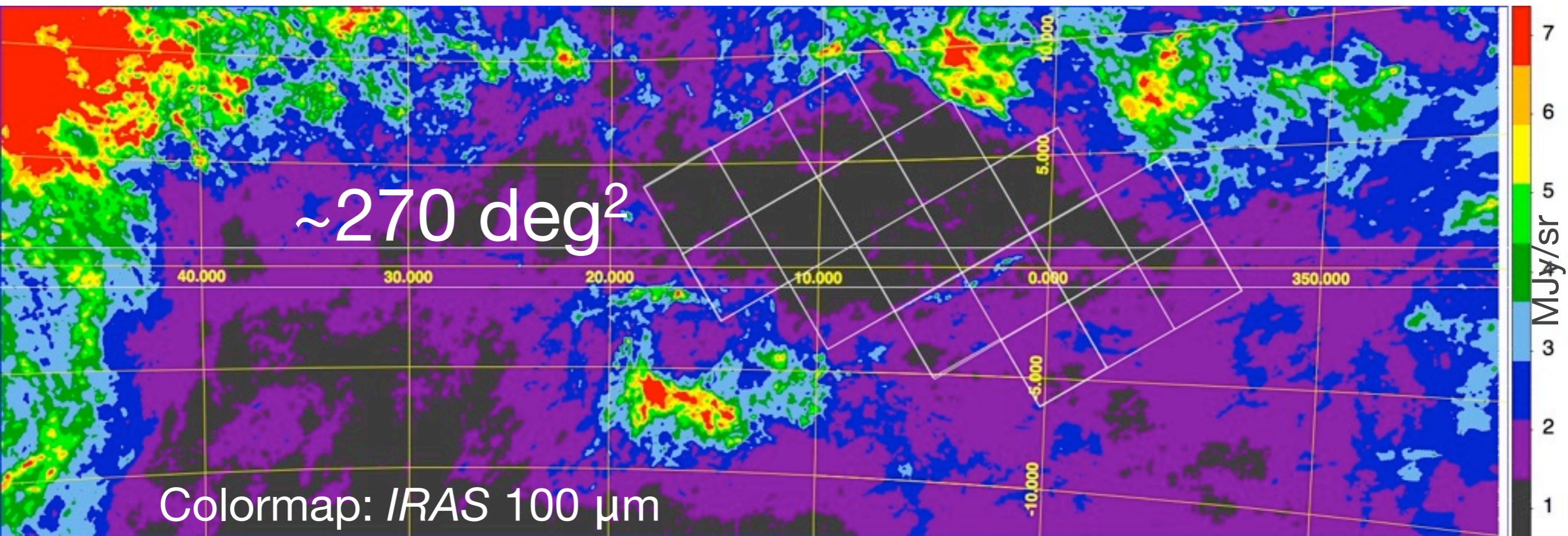
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calibration



- Spectral weight different for Neptune and CIB
- Beam corrections = 0.99, 0.98, 0.95 at 250, 350, and 500  $\mu\text{m}$

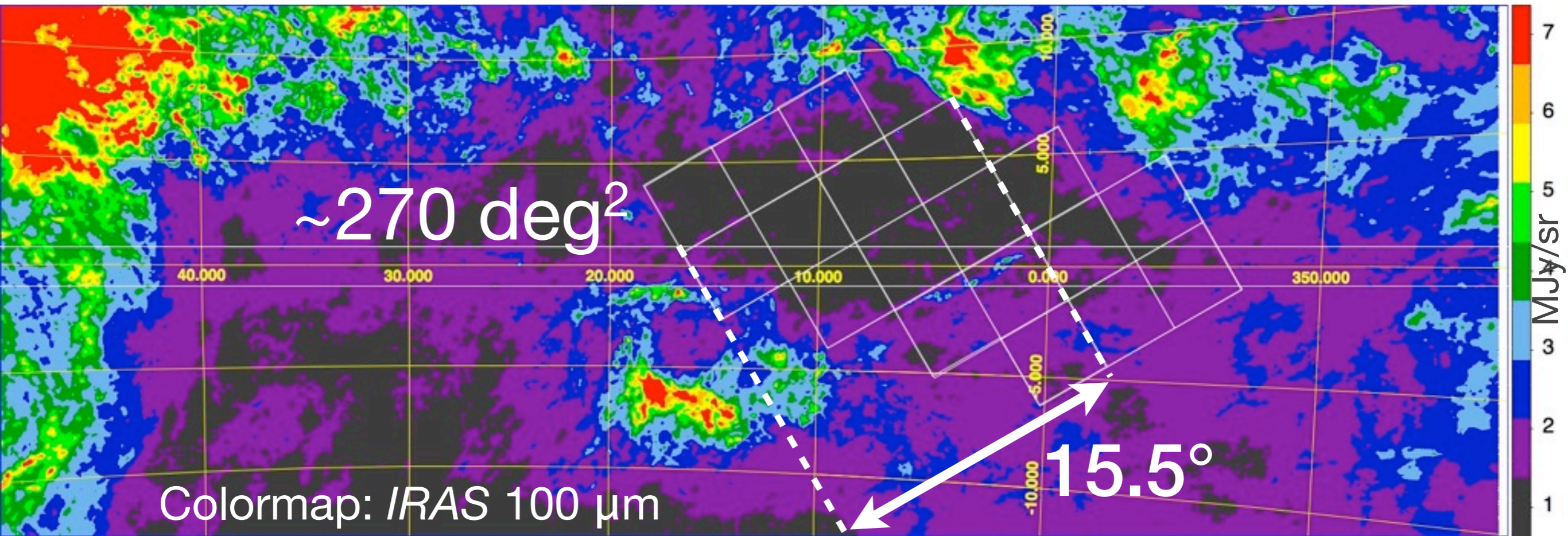
effective beam area



PI: Viero

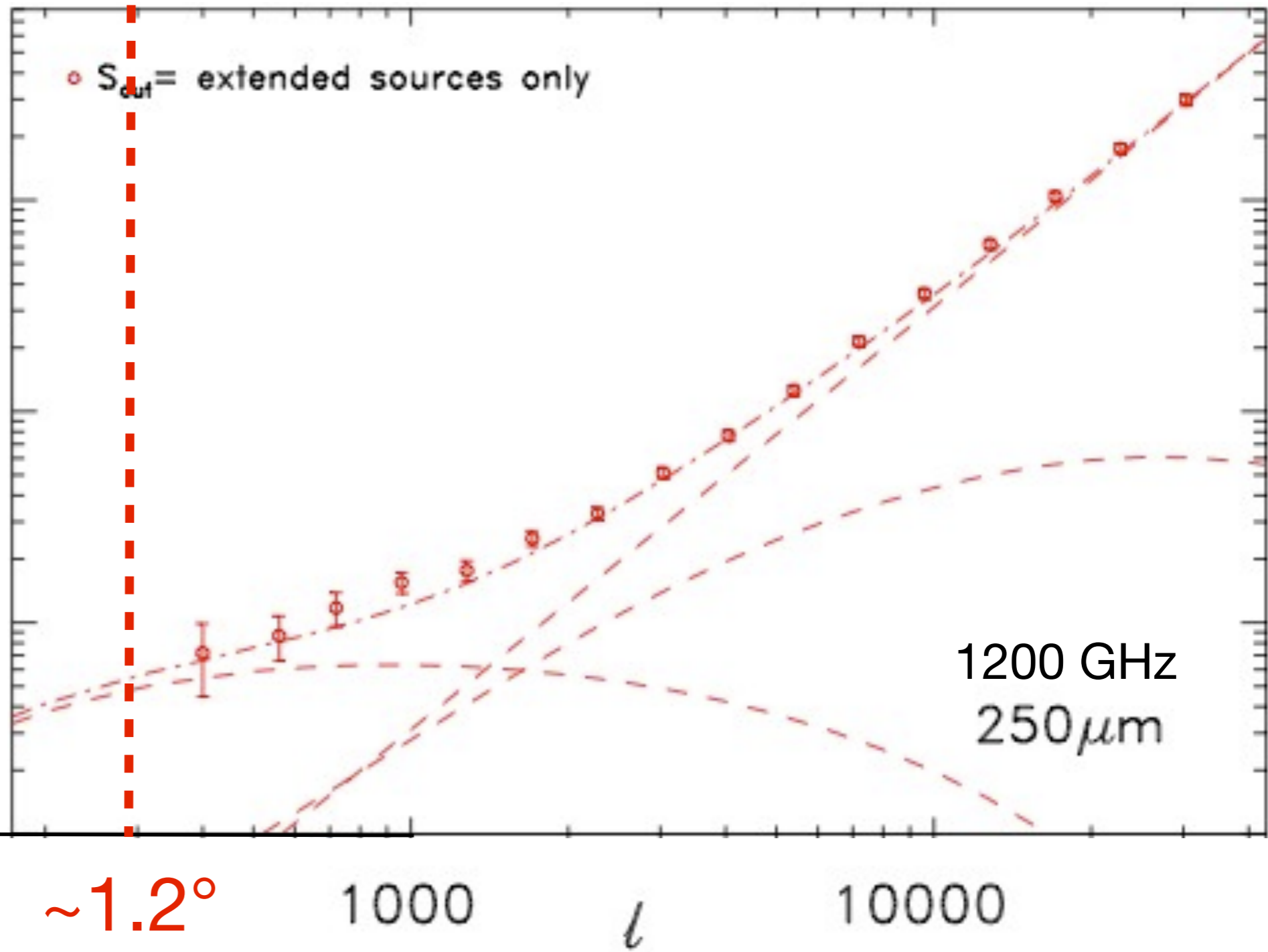
# HerMES Large-Mode Survey (HeLMS)





PI: Viero

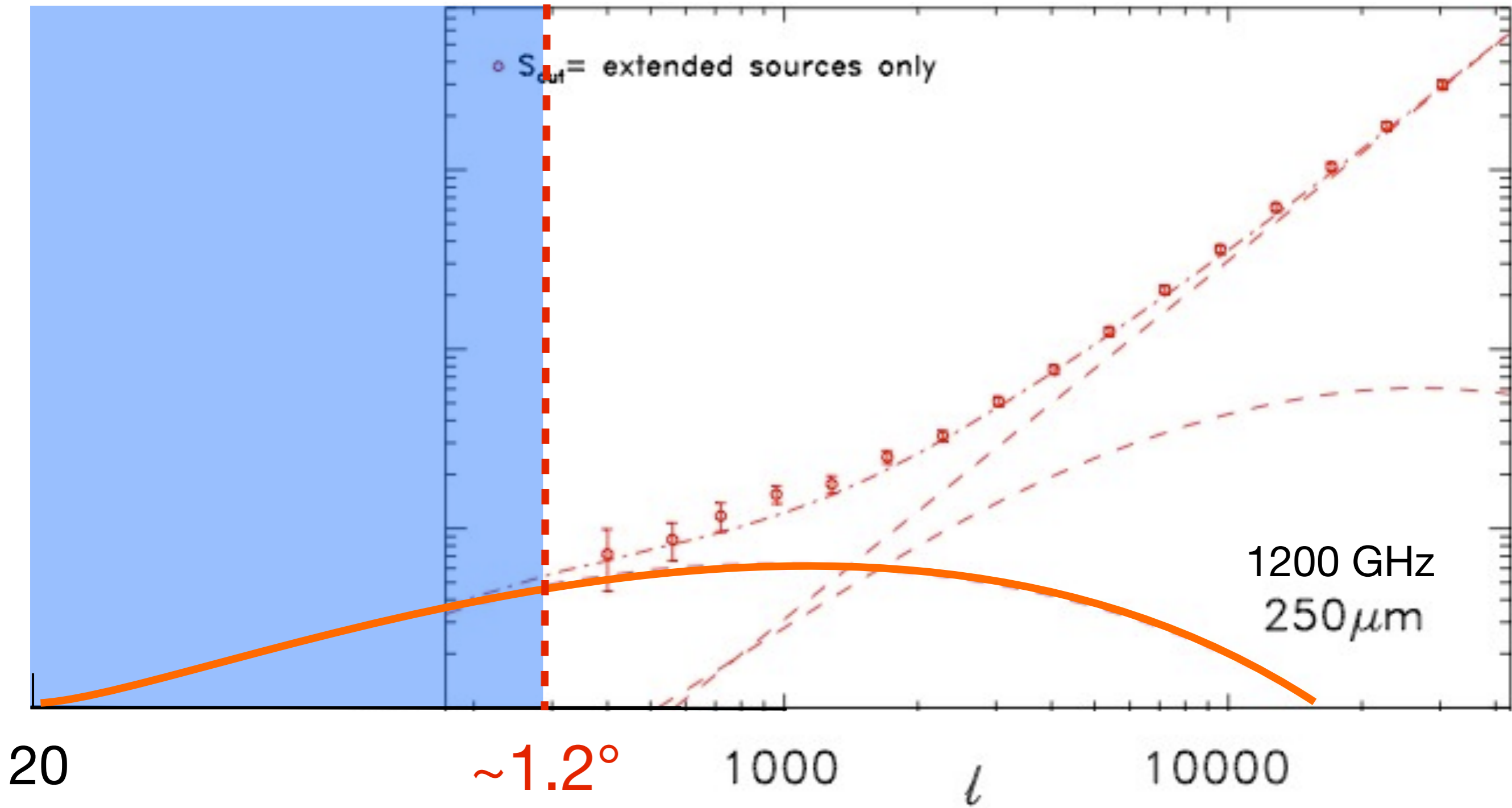
# HerMES Large-Mode Survey (HeLMS)



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# HeLMS





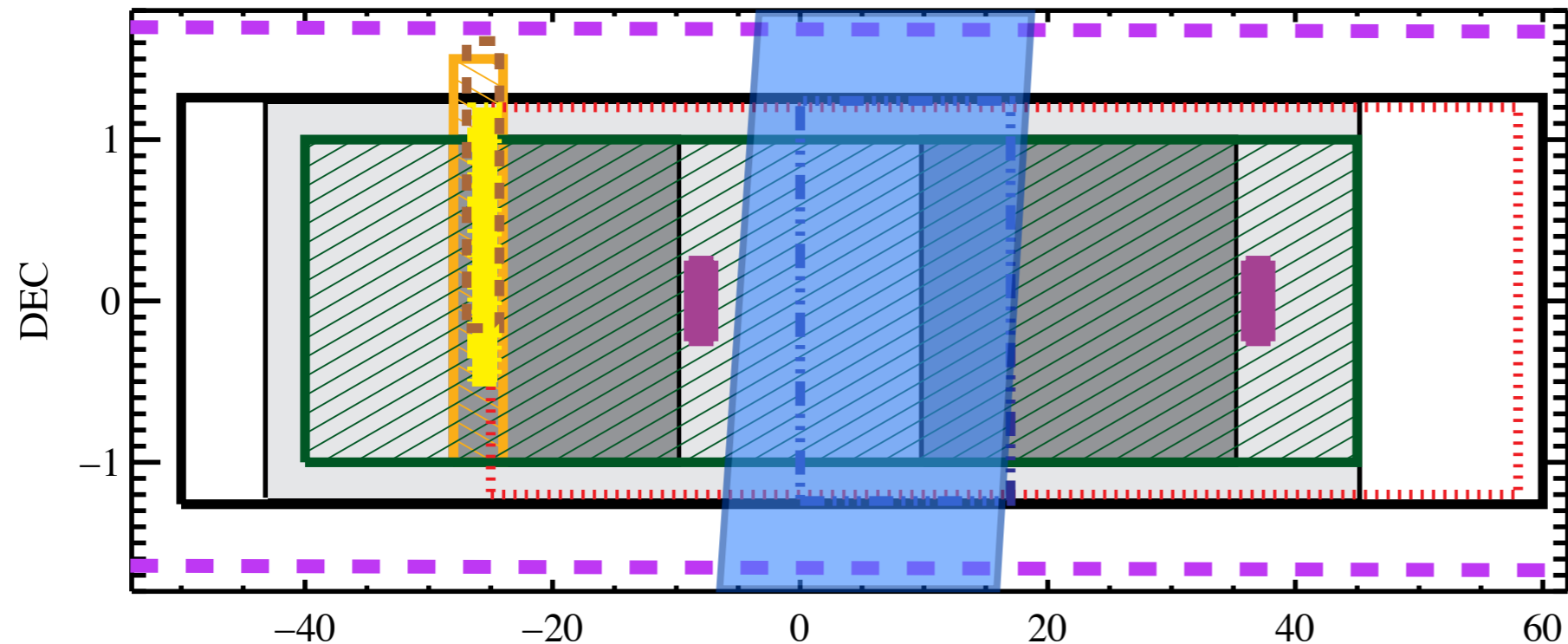
HeLMS

## Today

- SDSS optical
- ACT (80 deg<sup>2</sup>)
- CFHT
- UKIDDS
- VLA
- Wiggle-z
- BOSS

## Tomorrow

- ALMA
- ACTpol
- Spitzer Warm
- Planck
- Visible from most sites



### Imaging :

- Stripe 82 SDSS imaging (ugriz,  $i < 22.75$ , 270 deg<sup>2</sup>)
- ▨ CFHT Stripe 82 survey (170 deg<sup>2</sup>,  $i < 23.5$ , seeing  $< 0.8''$ ) and VISTA J and K
- ⋯ UKIDDS LAS,  $K_{\text{vega}} = 18.4$
- - - UKIDSS: DXS Field 4
- ▨ CFHTLS W4
- Level 6.5

### Spectroscopy :

- ▨ BOSS (220 deg<sup>2</sup>, 40,000 redshifts)
  - ▨ DEEP2 and PRIMUS
  - ▨ VVDS
  - ⋯ Wiggle-z
- ### Radio :
- ▨ VLA
  - ▨ ACT

# HeLMS ancillary data



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conclusions

- Strength of 1-halo clustering term  
a strong function of the masking  
level

---

# conclusions



- Strength of 1-halo clustering term a strong function of the masking level
- Fitting an HOD to the CIB spectra should provide insight on how DSFGs occupy dark matter halos

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# conclusions