

POLARIZATION FRACTION OF *PLANCK* GALACTIC COLD CLUMPS AND FORECASTS FOR THE SIMONS OBSERVATORY



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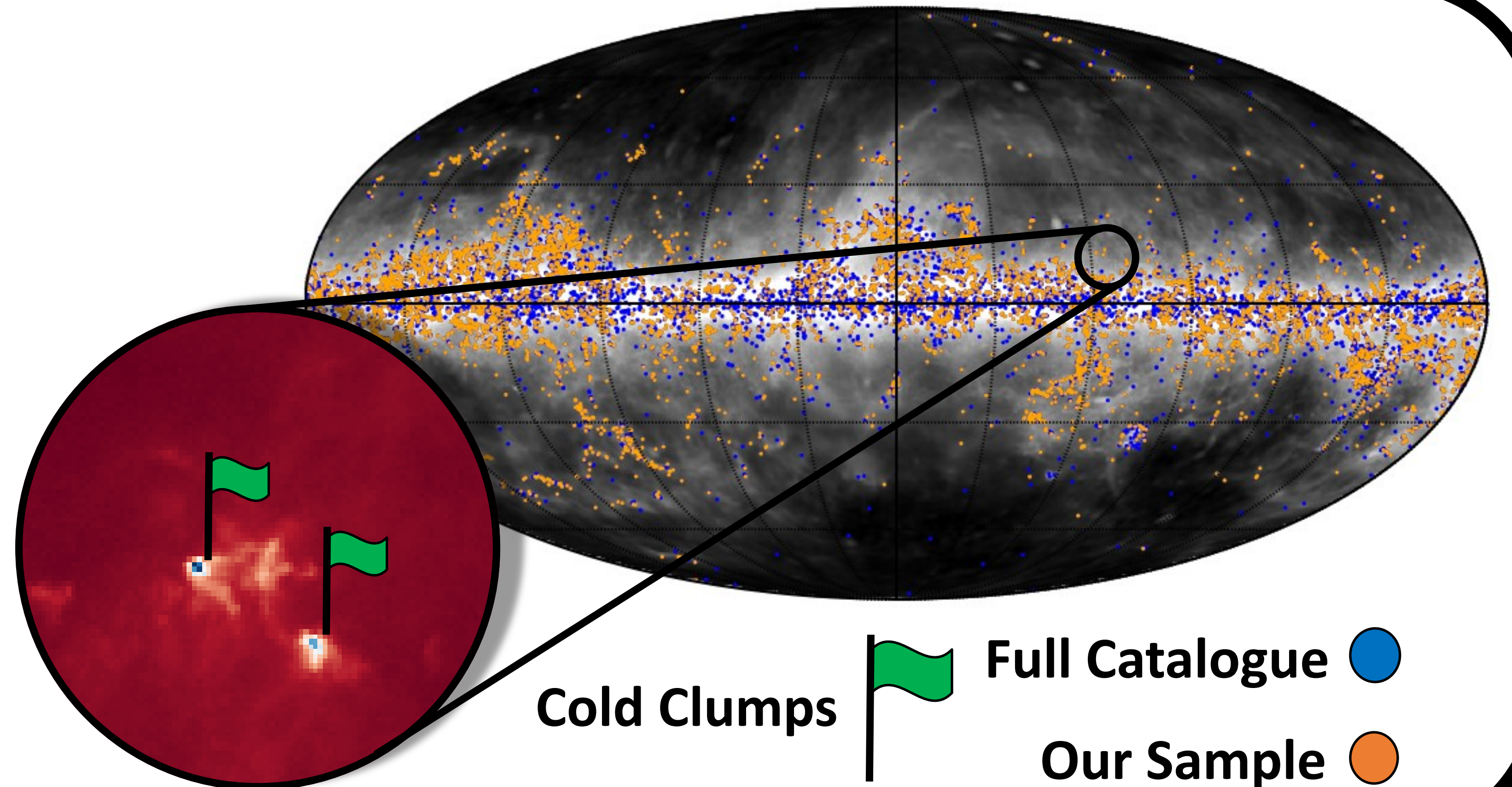
GALACTIC COLD CLUMPS

What are cold clumps?

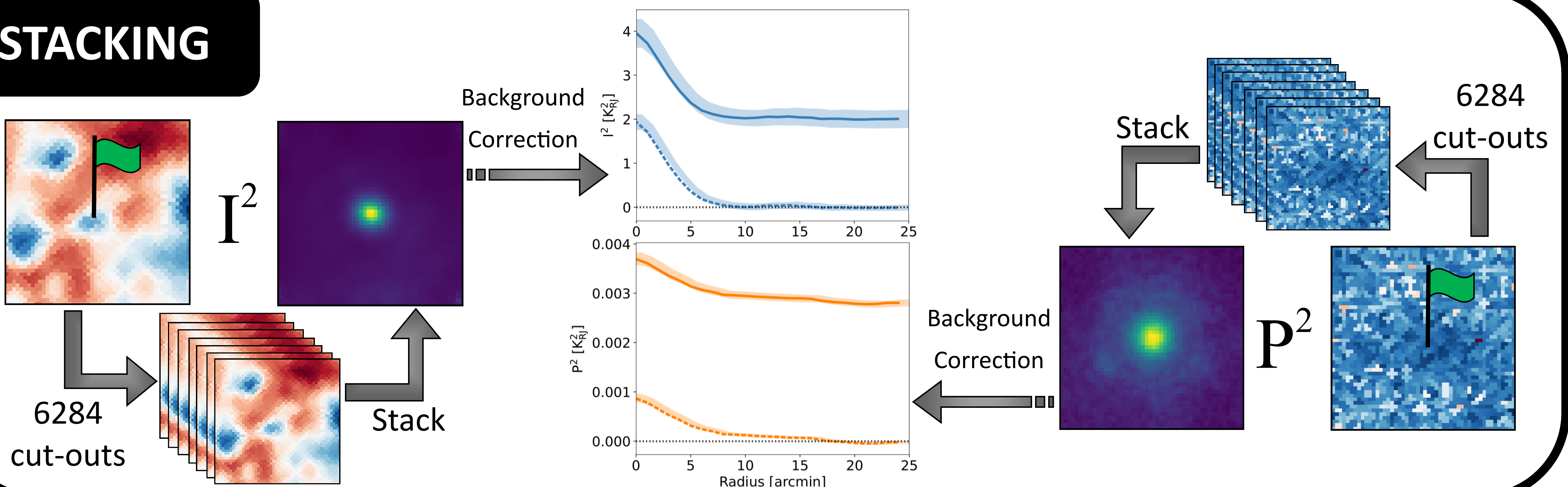
- Dense and cold regions within interstellar molecular clouds
- Larger than 0.1 pc and can contain substructures
- Capable of star formation under self-gravitational collapse
- High dust content shields from external stellar heating

What are we looking for?

- How do magnetic fields impact cold clump formation and evolution?
- We need polarization information!



STACKING



POLARIZATION

Mean-squared polarization fraction

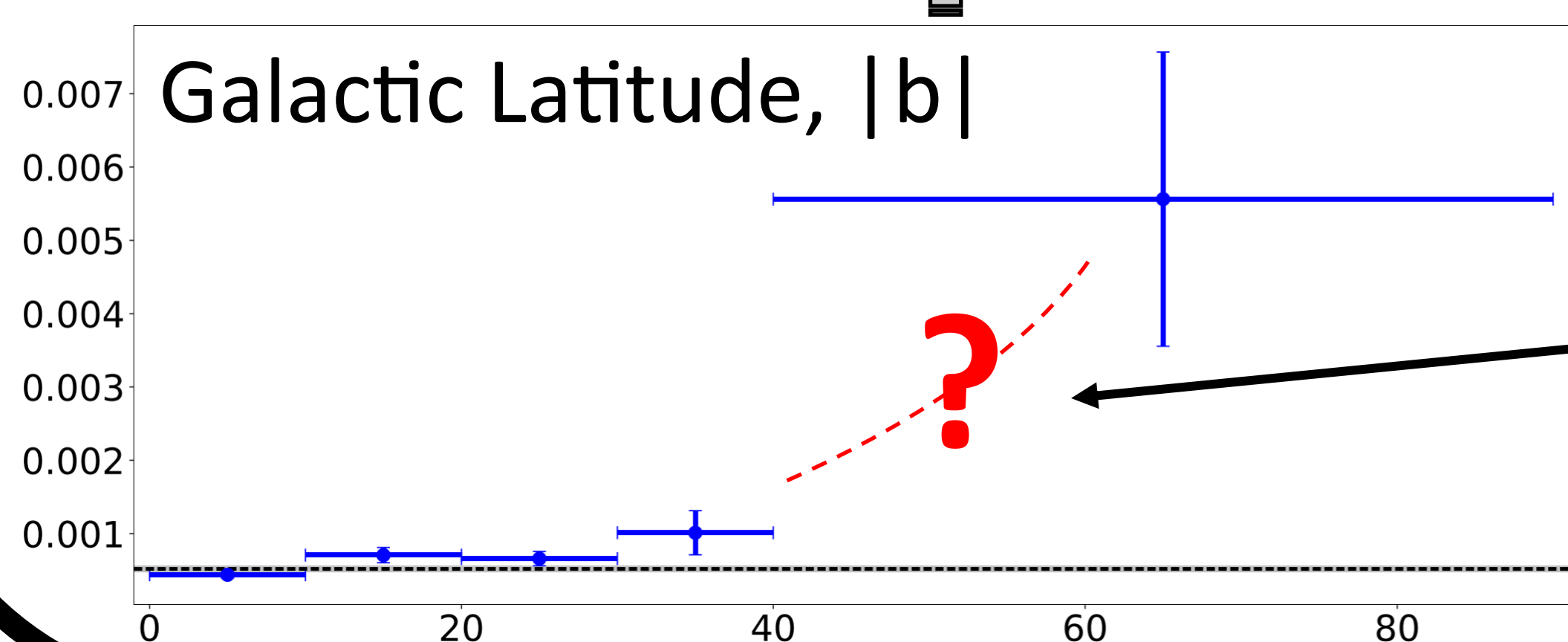
$$\frac{\langle P^2 \rangle}{\langle I^2 \rangle} = [4.79 \pm 0.44] \times 10^{-4}$$

Luminosity

Flux Density

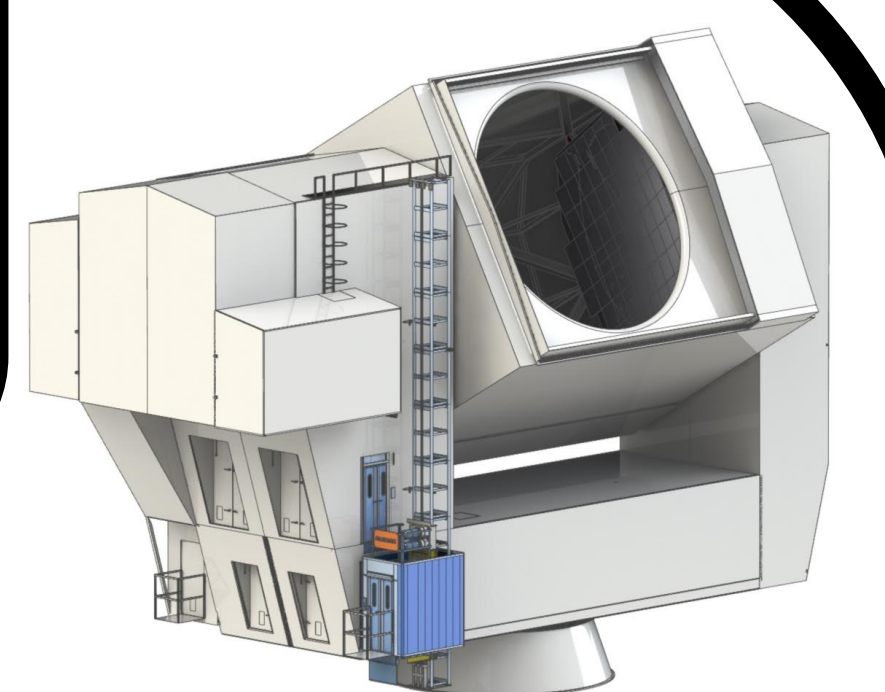
No Dependence

Physical Distance

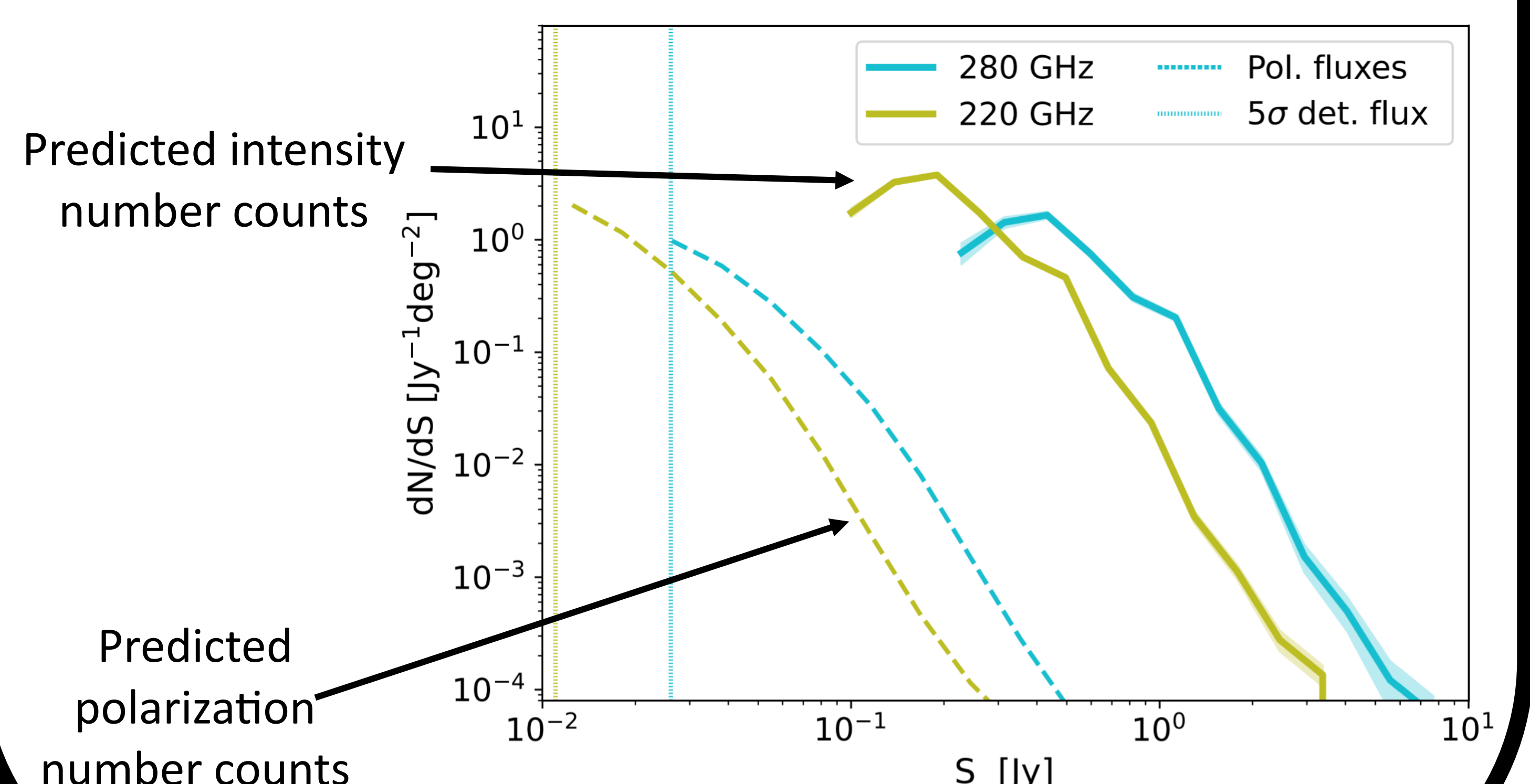


Sample constraints mean we can't say if this is systematics or science

SIMONS OBSERVATORY & FORECASTS



- Angular resolution of order 1'
- Noise levels between 22 and 54 $\mu\text{K-arcmin}$ at 220 & 280 GHz
- At $> 5\sigma$ significance we predict at least 12,000 detections of cold clumps in intensity and ~ 430 in polarization
- This would represent a two orders of magnitude increase over *Planck* results



Contact Info



Paper & References on ArXiv

