

My Research Visions

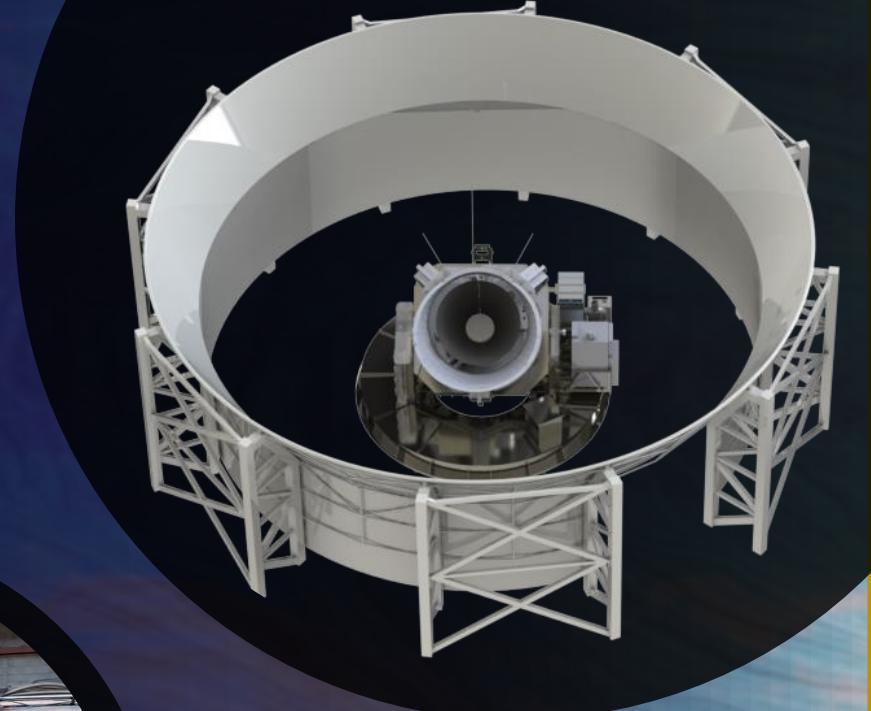
Nicholas Galitzki

University of California San Diego

University of California Riverside

'Zoom Day' Visit

May 8th, 2020



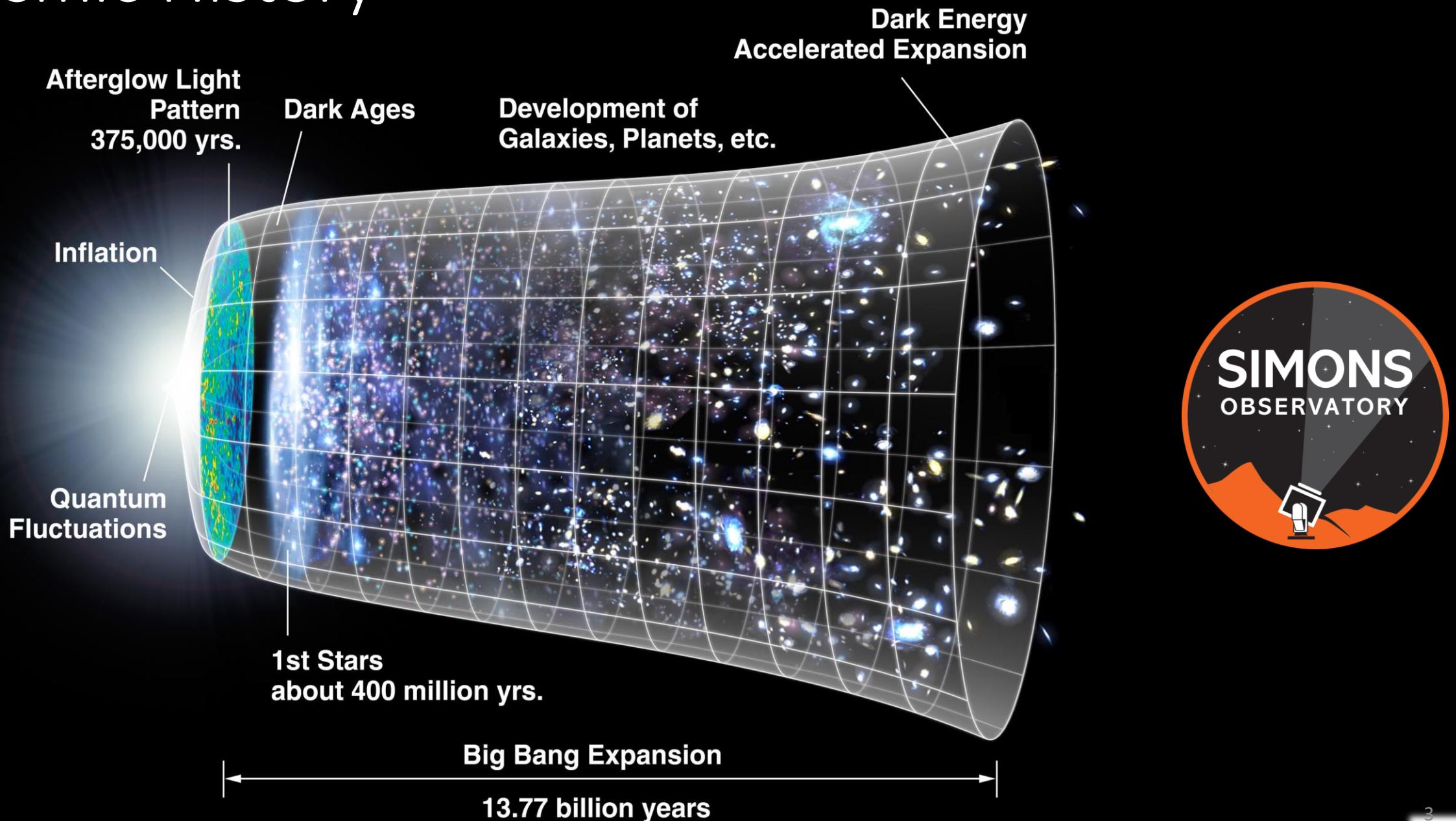
My Research Foci

CMB Science with the Simons
Observatory and CMB – Stage 4

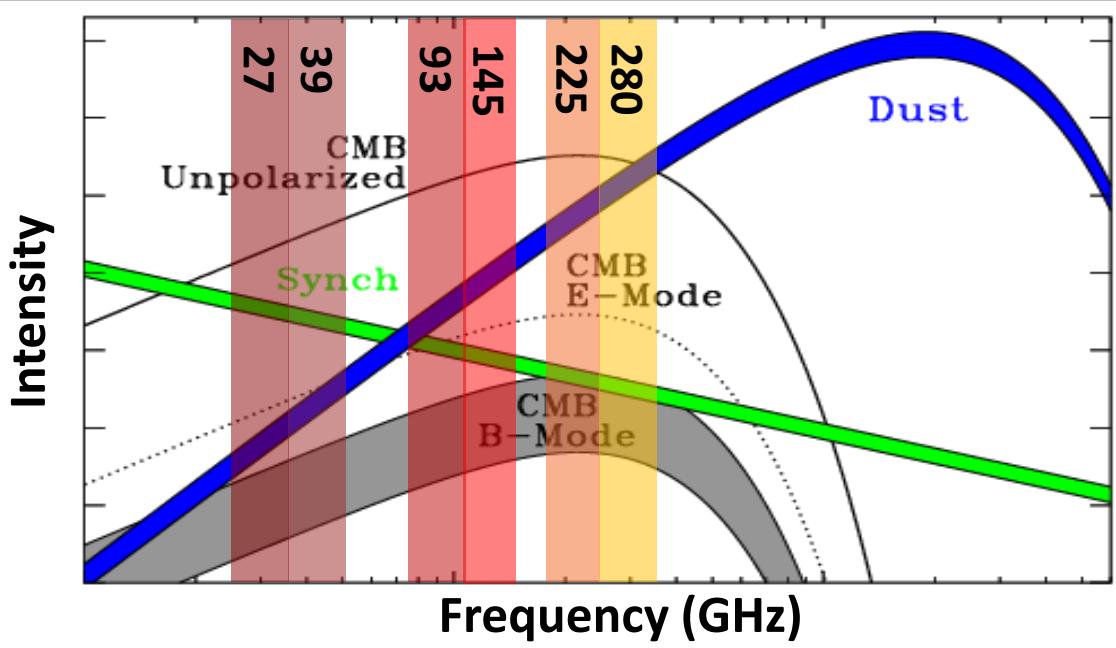
Understanding Galactic Emission

Outreach and Diversity

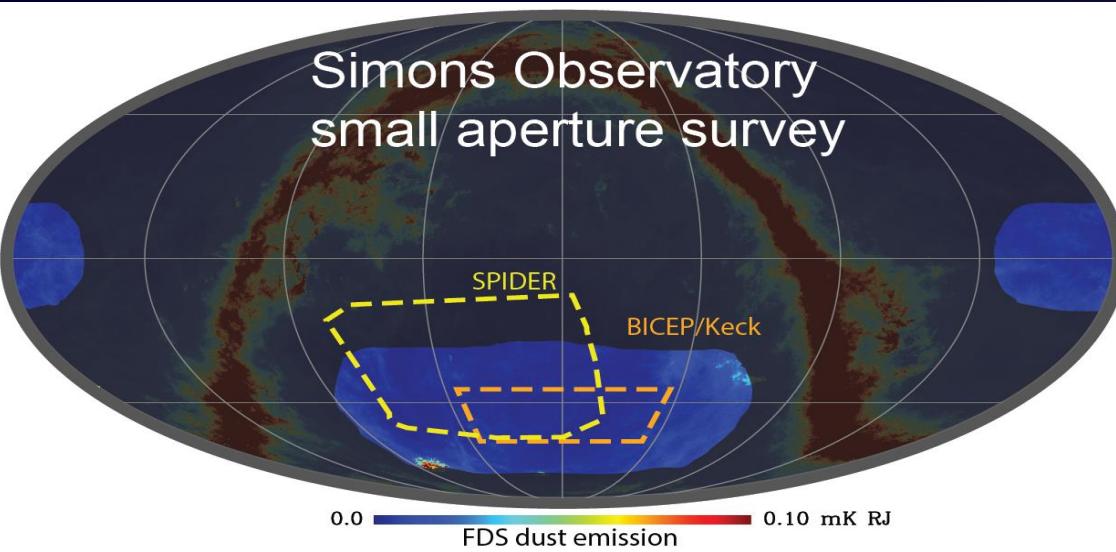
Cosmic History



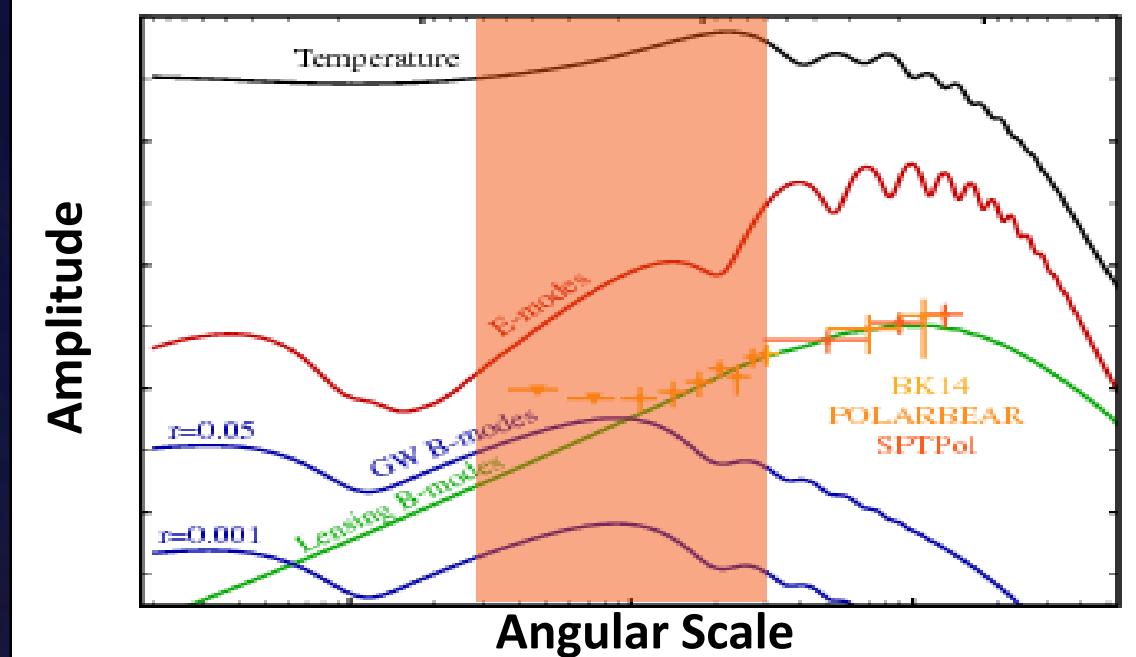
30 to 280 GHz Frequencies



10% Sky Fraction



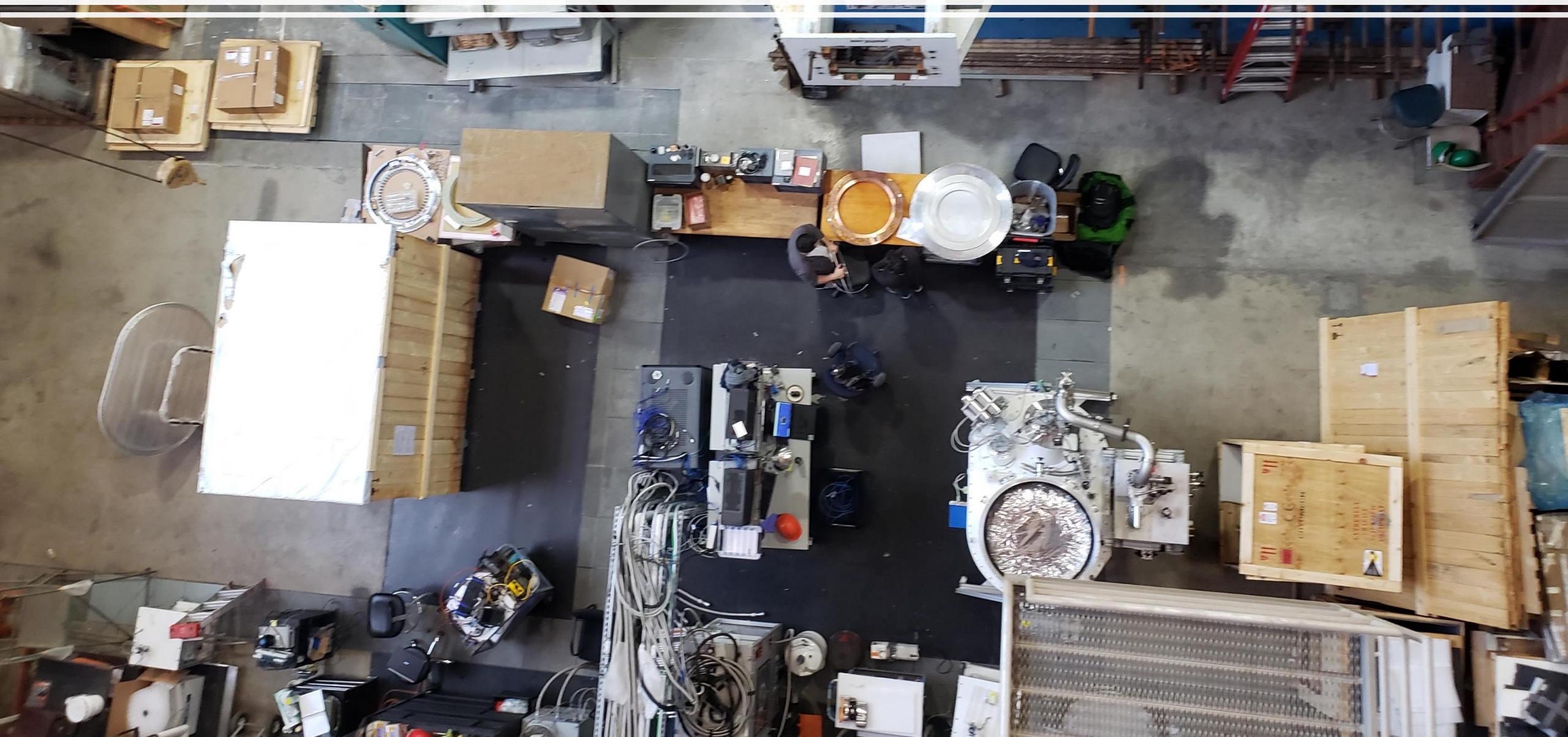
Low multipoles ($30 < \ell < 300$)



CMB Science with SO and S4

Constraining primordial gravitational waves

UCSD Lab Tour





Delivery



Single Pixel Testing



Electronics Installation



Focal Plane Assembly



Cold Readout Assembly



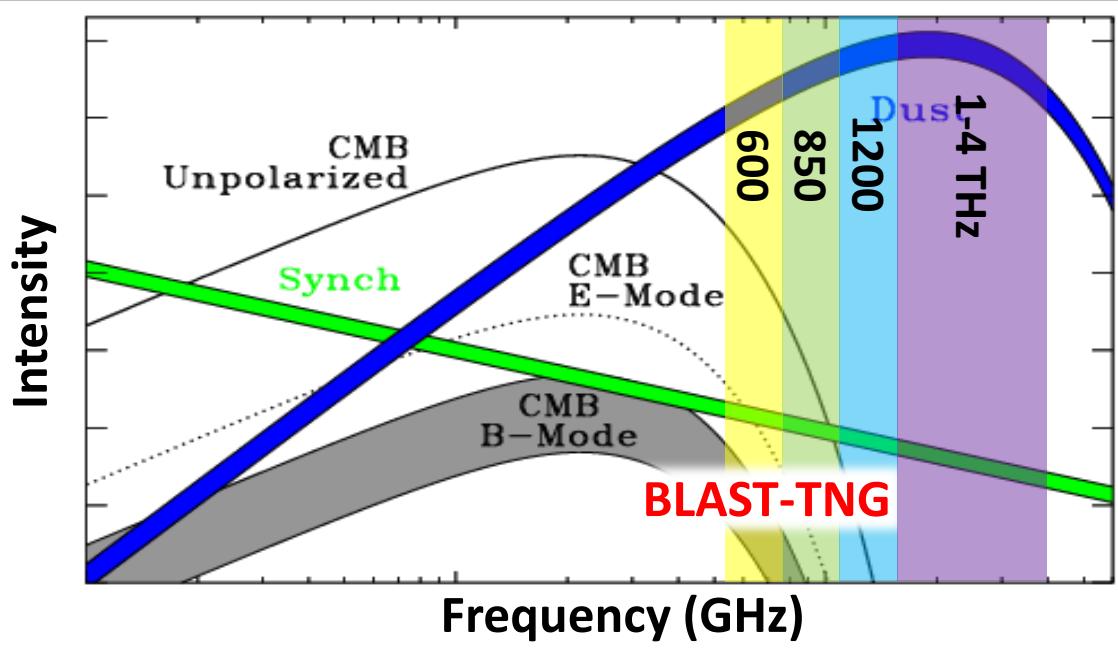
Mock Focal Plane Installation

My Research at UCSD

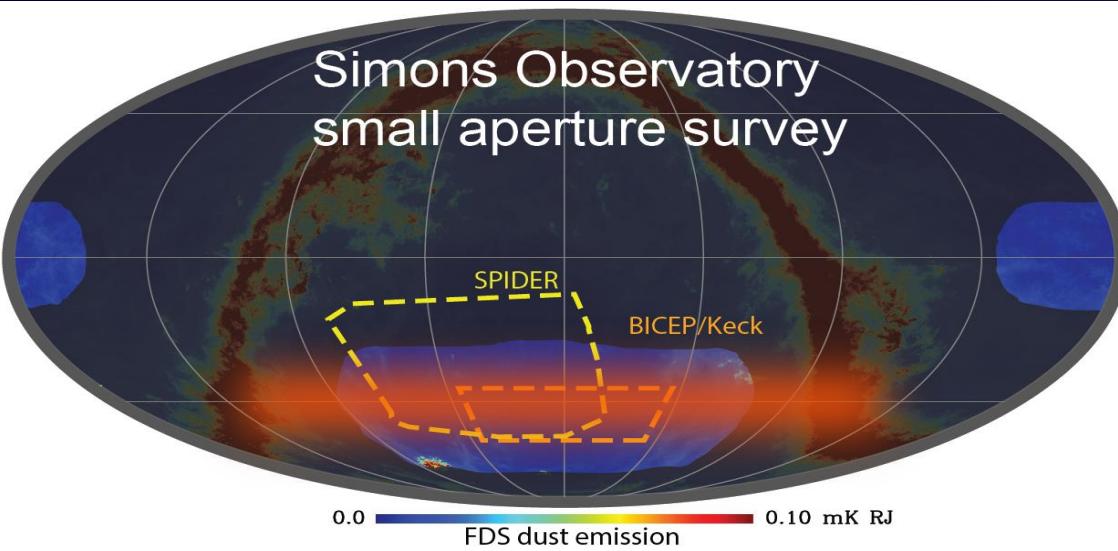
CMB Science with SO and S4 – Constraining B-modes

Project Status	My Future Research	Personnel	Funding
SO 2021-2023 <ul style="list-style-type: none">• First light• Site deployment• Calibration	Commission full SO Calibration hardware Implement improvements Site deployment Contribute to SO expansions Develop data pipeline	Grad students (~2) Undergrads (~2)	SO NSF-CAREER(\$500k)
SO 2021-2027 <ul style="list-style-type: none">• Observations• Pipeline and analysis• Maintenance• SO enhanced			
S4 2021-2027 <ul style="list-style-type: none">• Design• Construction• Deployment	Contribute to S4 SAT design Potentially test or integrate S4 SATs	Grad student (~1)	CMB-S4 DOE – EC (\$750k)
General Resources:		Lab space, computing, machining/hardware	

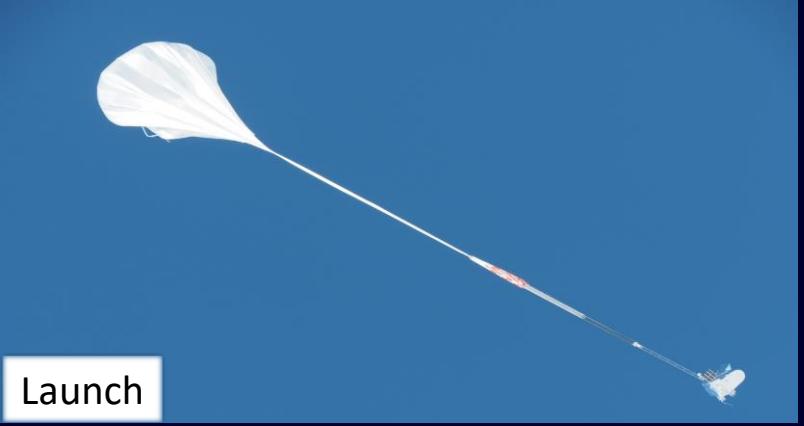
0.5 to 4 THz Frequencies



Small Sky Fraction



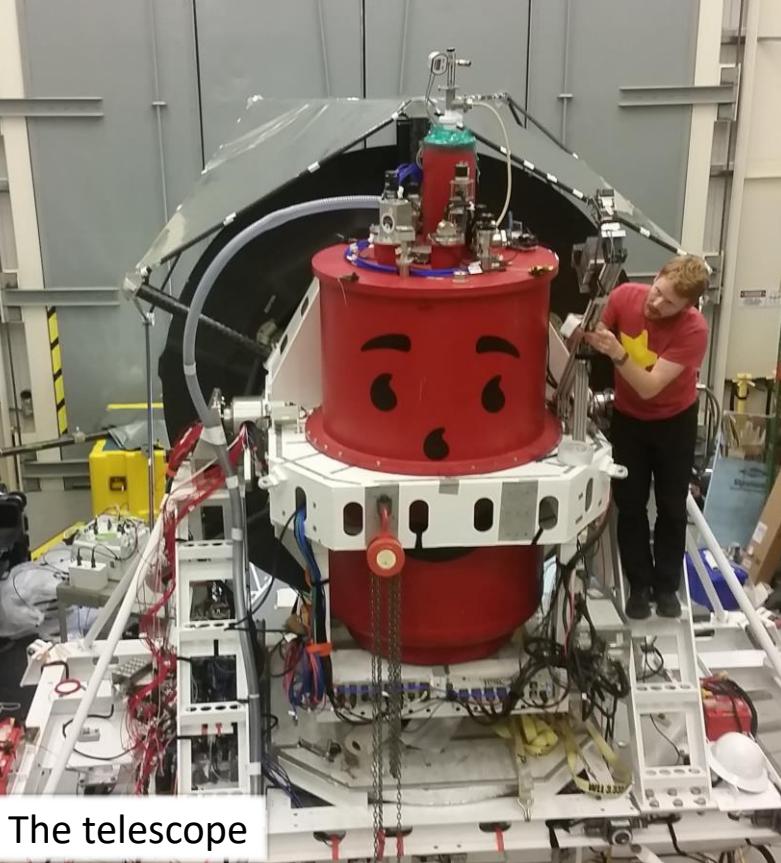
Understanding Galactic Dust Emission



Launch



Launch ready



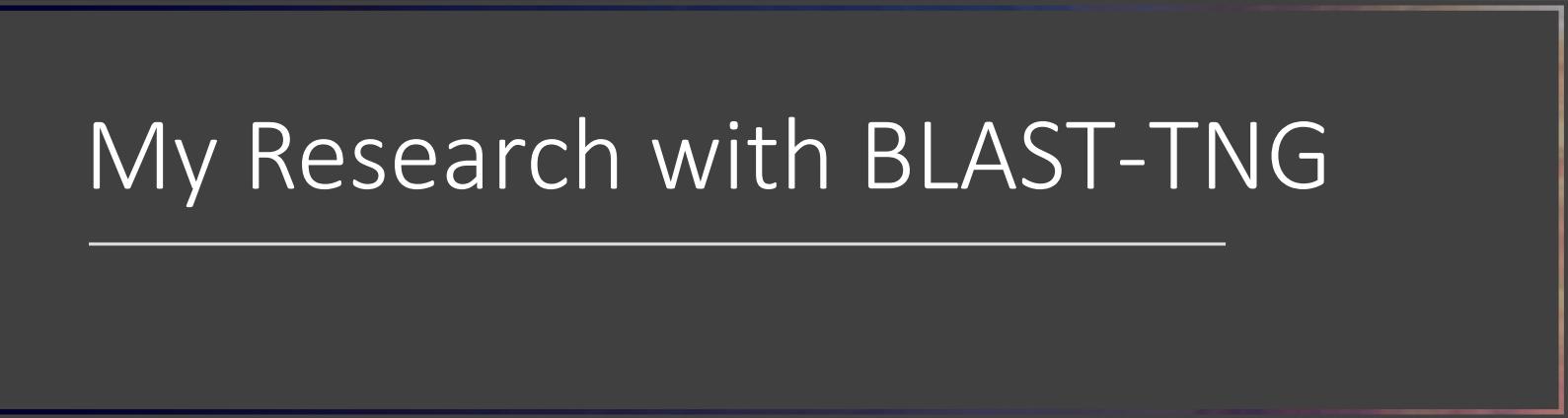
The telescope



The lab



The crew



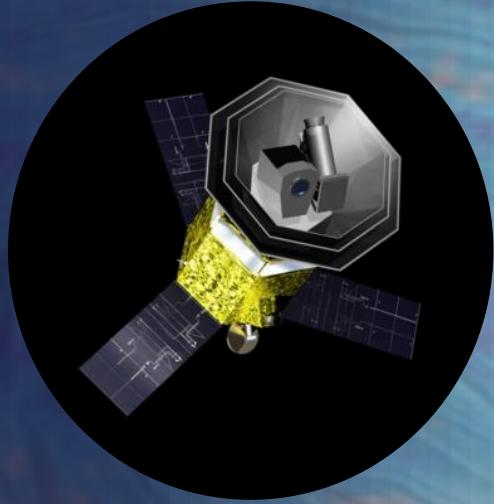
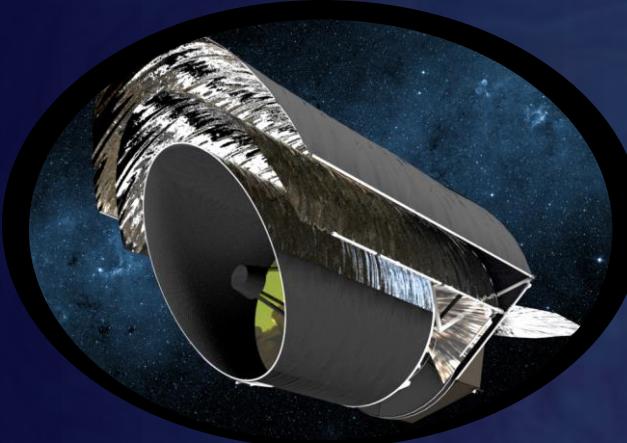
Understanding Galactic Emission

Project Status	My Future Research	Personnel	Funding
BLAST-TNG 2021-2027 <ul style="list-style-type: none">• Rebuild• Test• Second flight• Data analysis	<ul style="list-style-type: none">• Camera integration• Detector array testing• Lab calibration• Deployment• Analysis	Postdoc (1) Grad students (~2) Undergrads (~2)	NASA – Pioneer(\$20m) NASA - RTF(\$300k) NASA – APRA(\$6m)
THz Mission 2023-2030 <ul style="list-style-type: none">• Propose as principal investigator• Design through analysis	<ul style="list-style-type: none">• Design• Build• Test• Launch• Analysis		
General Resources:		Lab space, cryostat, computing, machining/hardware, electronics	

And Beyond...

Decadal involvement:

- SO - Enhanced
- CMB-S4
- CMB-HD
- PICO Satellite

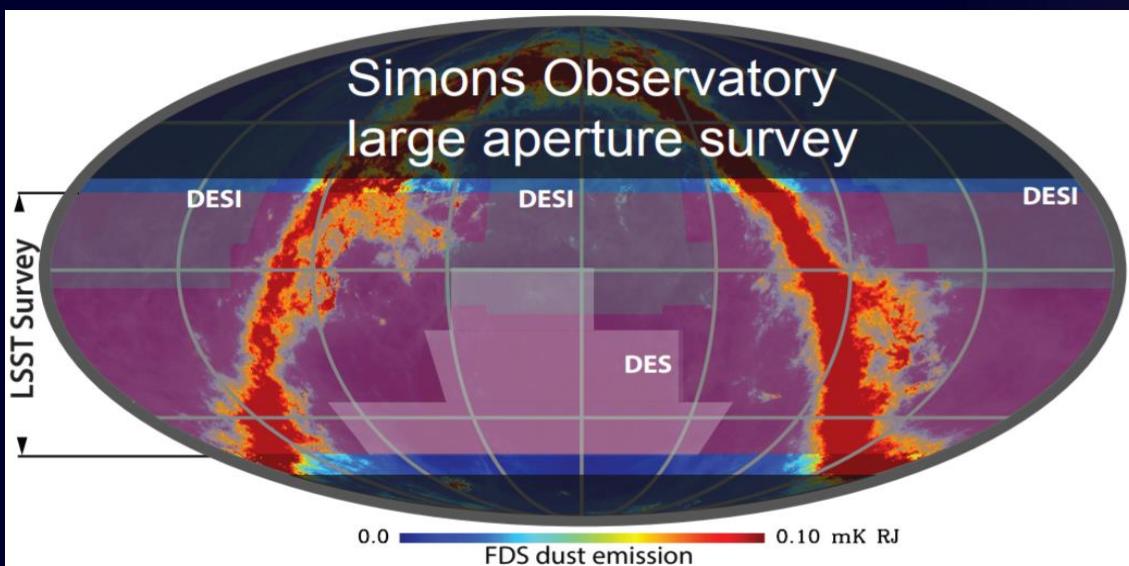


CMB Science with SO and S4

Potential UCR Tie-ins

Additional science targets

- *Effective number of relativistic species (N_{eff})*
- *Clusters and lensing science*
- *Sum of the neutrino masses ($\sum m_\nu$)*
- *Cosmic birefringence*
- *Galactic science*



- Early universe research
- Experimental development
- Large experiment structure
- Physics beyond standard model



Outreach and Diversity at UCR



My Outreach Experience

[UCSD Cosmology](#)
[Simons Observatory](#)

Outreach and Diversity at UCR

Potential Contributions

Programs

- Cal-Bridge
- CAMPARE

Dept. Initiatives

- Committee on D&I
- Social Media
- Demos
- Events

Community

- Local partnerships
- Events

Goals

Mentor and provide research opportunities to URMs

Service to department D&I and EPO organization
Facilitate grad/undergrad participation

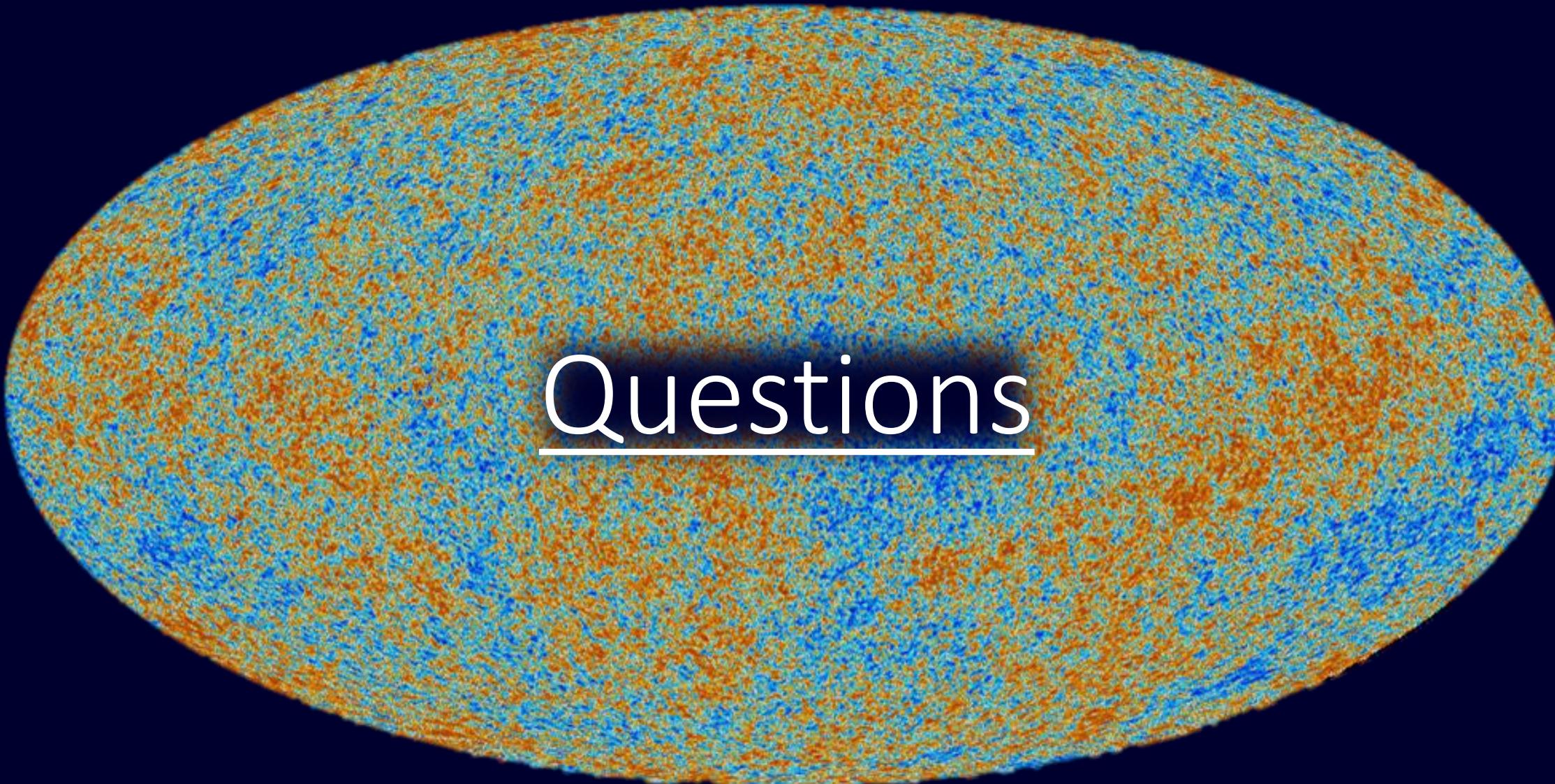
Create AoT Riverside
Establish presence at local science events

Outcomes and Metrics

Develop pipeline to UCR PhD programs

Robust and well documented EPO program

Improved community connections



Questions

Teaching

Level

Introductory

Broad Interests

Intro physics

Intro astronomy

Cosmology

Upper division

Cosmology

Astronomy

Graduate

Radiative processes

ISM

Instrumentation and observation

Potential UCR Classes

Phys 002 /040/041 series

Phys 007/Phys 037

Phys 020

Phys 166

Phys 211A

Phys 213

Phys 214

Phys 218

Phys 224