# CMB Probe Mission Study

(Draft Slides) April 12, 2017

#### Overview

- Admin
- Requirements on r
  - organizing resolution trade-offs studies
- Foregrounds
  - organizing foreground cleaning forecasting
- Spectrometer
  - organizing deliverables from a super-pixie, compspec
- Ancillary science
  - organizing galactic science inputs

# Admin

- Bock replaces Lawrence in EC
- Lawrence is ex-officio
- Trangsrud is ex-officio
- Panel review is available on EC site

# Science Requirements: r

- A CMB space mission will survey the entire sky
- Science deliverables will depend on its own performance and other guaranteed data
  - Motivate a specific r value? (e.g. 5 sigma rejection of Starobinsky model)
  - Resolution: "what is the level of r that can be achieved as a function of resolution and depth?"
    - Noise levels: assume calculated sensitivities (use WMAP/Planck safety margins)
    - W/Out foregrounds (see next page)



Carlstrom P5/ CF5 slides

### Science Requirements: r + foregrounds

 Setting up a foreground cleaning study - full sky



Carlstrom P5/ CF5 slides

#### Spectrometer

- What is the case for a super-pixie?
  - relative to pixie250
  - vis-a-vis self-delensing
- What is the case for a merged instrument?
- Organizing the work

#### Ancillary Science

- Reach out to magnetic field + dust community
  - e-mail to HAWC team? (HAWC = polarimeter on SOFIA; 5 bands between 40 - 300 um)

## Few slides from last week

### Mission: To Sort Out

- Imager: Resolution (EPIC-LC (30cm), LiteBIRD (50 cm) / EPIC-IM (140 cm))
  - CIB, Lensing, Galactic Magnetic field science
  - Complementarity with sub-orbital, S3/S4
  - Level of self-delensing
  - Cost constraints



Core Proposal Left: Planck Middle: S3 Right: CORE (2 uK\*arcmin; 1.2 m)

Reconstruction noise of lensing deflection power spectrum

## Mission Consensus Statements

- A CMB space mission will survey the entire sky
  - r, tau, N\_eff, (neutrino mass with tau and BAO)
  - Work: set science requirements, measurement requirements, instrument parameters



#### Probe Proposal

## Mission Consensus Statements

- A CMB space mission will implement a broad range of frequencies
- Work: decide on frequency bands and optimize band allocation



#### Probe Proposal

### Mission: To Sort Out

- Spectrometer (e.g. PIXIE) / Imager
  - Super Pixie alone?
    - What is the science gain relative to PIXIE250 (r<0.0004 2 sigma)</li>
    - Complementarity with suborbital, S3/S4
    - Level of self-delensing
  - PIXIE+Imager
    - Cost vs. Science benefit





Probe Proposal

# Who are we?



#### Science Requirements

Space/Sub-Orbital Complementarity

Instrument Design