

Analysis of Need to go to Space

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Basic/Traditional Points

- Frequency coverage
- Sky coverage
- Clean, stable environment
- Integration time
- Scan pattern

Basic/Traditional Points

- Frequency coverage
 - *foreground control; particularly important for polarization*
- Sky coverage
 - *Smaller cosmic variance*
 - *Better control of E-B leakage*
 - *Large angular scales: lower lensing foreground*
- Clean, stable environment
 - *No atmospheric noise (loading)*
 - *No atmospheric fluctuations*
 - *No ground pick-up*
- Integration time
- Scan pattern
 - *Better cross-linking than, e.g., from SP*

Objections to Overcome

- Cost/return
- Time scale
- Inherent risk of space mission

All related to analysis of what can be done from the ground

Case

- Frequency coverage **Clear advantage**
 - *Some input from current obs/models; turn current ignorance into an argument!*
- Sky coverage **Important Issues to address.**
- Clean, stable environment **Need some detailed #s**
 - *Raw sensitivity on sky*
 - *Level of atmospheric fluctuations coupling to measured polarization signal*
 - *Ground pickup impact on current SP experiments*
- Integration time ***Is this true?***
- Scan pattern
 - *Simple estimation of gain from better angle sampling.*

Methodology

- Space vs ground (e.g., SP) for a given detector array
 - Raw sensitivity on sky
 - Atmospheric degradation
 - Scanning strategy
- With these results in hand, discuss space platform gains from:
 - More frequency coverage
 - More sky coverage

Key Issues

- What can/will be done from the ground by ~2020?
 - What target value of r are we aiming for? Important for quantifying above arguments.
- Sky coverage & foregrounds
 - What is the foreground limit? **Best estimate today.**
 - Clean patches vs. all sky
 - *Clear all-sky advantage if we could reach lensing foreground*
 - *However, we will be hitting Galactic foregrounds*
 - **Do we do better with more sky than can be reached from the ground?**
 - **Do we do better on large angular scales; foregrounds are worse.**

Input at this Stage

- Target value for r
- Evaluation of ground-based capabilities in terms of r
- Foreground levels
- Instrumental sensitivity on ground
- Atmosphere-induced fluctuation level
- Ground pick-up difficulties
- Evaluation/idea of importance of cross linking
- How to approach key issue at this stage?