

# A short history

- 2003 Quarks to the Cosmos.
- Beyond Einstein Program.
  - What Powered the Big Bang?
- 2004 Mission Concept study Announcement.
  - inflation probes. Three responses. One of these became EPIC.
- 2006 BEPAC (Beyond Einstein Program Assessment Committee)
- 2006 BEPAC recommends LISA and JDEM first.
- PPPDT (Primordial Polarization Program Definition Team) initiated by NASA.

# CMBpol Mission Concept Study

- NASA issues a new AO (Announcement of Opportunity) for mission concept study in advance of 2010 Decadal Survey.
- PPPDT recommends a single response to the AO from the CMB community.

# Mission Concept Study

## Final Resulting Document

- Deliver a document to the Decadal Committee about the field. Why should this field be supported?
- Deliver a mission concept development plan to NASA for the future of the Inflation Probe in the Beyond Einstein Program

# Goals of Mission Concept Study

## Current state of the field

- Present the science which can be achieved with a CMB polarization mission
  - Primordial B-mode polarization
  - Foreground removal issues
  - Lensing B-modes
  - Ancillary science - galactic emission
- Develop a summary of what is known about systematic uncertainties how far we can go
- Outline the current state of the instrumentation and what new developments are upcoming.

# Goals of Mission Concept Study

## Developing a Plan for the Decade

- What do we need to do in theory and analysis?
  - Primary Science - limits on  $r$ , non-gaussianity
  - Foregrounds
  - Lensing
  - Ancillary science topics - galactic astrophysics, neutrino mass ...

# Goals of Mission Concept Study

## Developing a Plan for the Decade

- What do we need to do to learn how to do the experiments?
  - Systematics
  - Instrument modeling
  - Scan strategy modeling
  - Beams, bands, knowledge of these
- Ground-based, balloon-borne, possibly also Explorer sized mission.
  - We need these to learn how to deal with the

# Goals of Mission Concept Study

## Developing a Plan for the Decade

- Evolving the technology to maturity
  - Detector readout
  - Amplifying to 1000 pixel focal planes
  - Cooling technology
  - Optics
  - Ground-based, balloon-borne, possibly also Explorer sized mission.

# Goals of Mission Concept Study

## A document for us

- Top level report
  - Written for the Decadal.
  - Aimed at the sophisticated non-specialist
  - Serves as an index for all underlying studies and documents
- Workshop reports
  - Contains an overview with main issues summarized.
  - Proceedings to be published
  - Online version. Open to everyone.
    - ▶ Underlying data, simulations, software linked in.
    - ▶ Cross linked with other workshops



# Goals of Mission Concept Study

A document for us

- Detailed Study Reports, also linked in.
  - Any detailed theory studies
  - Epic Phase II study
  - Technology studies

# Biggest questions we will have to have answered by next year.

- Is space needed?
- Can the primary science be done with a much lower cost space mission?