

Primordial Polarization Program

Definition Team - PPPDT

- PPPDT = CMBPol ‘project office / science team’
- Charter
 - Work with funding agencies on defining precursor experiments + technology development
 - Evaluate science requirements and performance metrics
 - Develop potential project plans and the philosophy for defining and conducting the science program
 - Explain goals of CMBPol to larger Astronomy community
 - Prepare materials for review by external committees
- Token funding

PPPDT

- 15 Member:

Charles Bennett

Josh Gundersen

Alan Kogut

Amber Miller

Charles Lawrence

Jamie Bock

Shaul Hanany

Lawrence Krauss

Harvey Moseley

Tony Readhead

Julian Borrill

Gary Hinshaw

Adrian Lee

Lyman Page

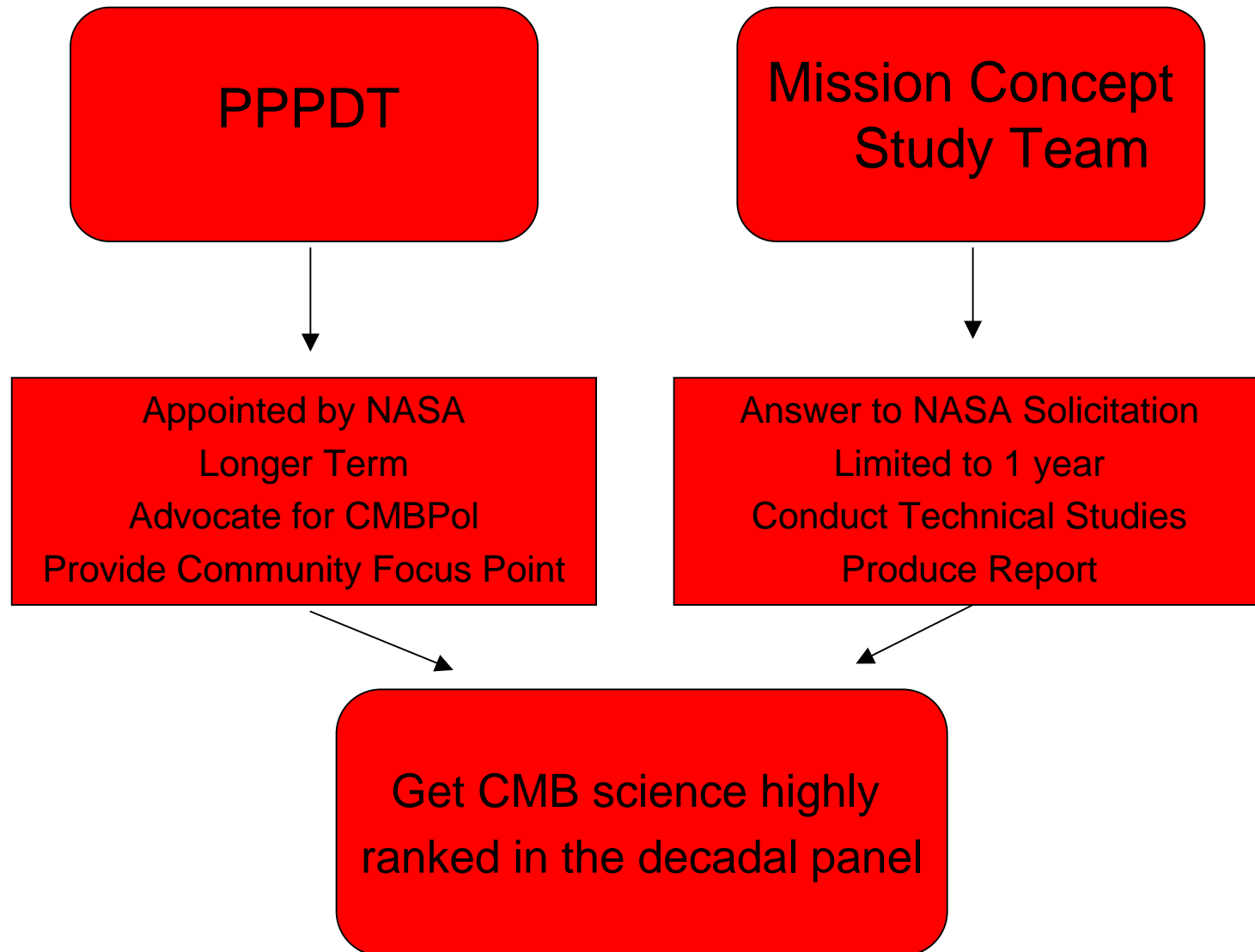
Peter Timbie

- <http://pppdt.physics.umn.edu/>
- First Telecon ~ Aug. 2007
- Simultaneous with NASA Solicitation for 'Strategic Mission Concept Studies'

PPPDT Response to NASA's Solicitation

- Concentrate on forthcoming report of decadal panel
- Decide to form a coherent program that might lead to CMBPol late in the decade
- Program will represent entire CMB community
- Chose Steve Meyer to lead the mission concept effort (Steve added as a member of the PPPDT)

Same Goal, Separate Functions



Other PPPDT Activities

- Arrange 4 theory telecons to discuss B-mode science (December 07 – February 08)
- Initiate statement in support of a program that leads to a future CMBPol (ongoing)
- Assemble arguments for CMBPol
 - Outcome of mission concept study
- Organize seminars + colloquia around the country
- Organize talks in APS, AAS, SPIE conferences
- Anything else we should be doing?

Satellite Support

Why a support statement?

- Space provides a definitive measurement
 - Full sky
 - High sensitivity
 - Broad frequency coverage
 - Low systematics
- A program to fly a satellite (when the opportunity arises) must begin now
 - With high ranking for the science in the decadal panel
 - With support for developing the technology
 - With support for sub-orbital experiments
 - With support for theory and data analysis grants
- It should be obvious that when the opportunity arises a re-assessment of the science case should and will be carried out

Satellite Support

Cosmologists are poised to take the next step in understanding how our universe began. At times close to the big bang the Universe evolved in ways which are outside of our current understanding, including the nature and cause for an early inflationary epoch. Measurements of the polarization of the cosmic microwave background radiation (CMB) probe these early epochs to provide information on physics at energy scales unattainable by any other mean. They will also significantly improve our information on the masses of the neutrinos, constrain the level of dark energy, elucidate structure formation in the Universe, and be an excellent probe of the epoch of reionization. A detailed map of the polarization of the CMB may provide yet unanticipated discoveries that could revolutionize our understanding of the Universe. Additional exciting by-products of polarization measurements at millimeter and sub-millimeter wavelengths will be a thorough characterization of galactic dust and sources of synchrotron radiation, and deeper understanding of galactic magnetic field strength and structure, all of which are of great interest to the astrophysical community.

Satellite Support

We believe that the only definitive way to fully exploit the abundant cosmological and astrophysical information that is encoded in the polarization at these wavelengths is with a dedicated satellite program that is supported and informed by a comprehensive set of ground and balloon borne experiments as well as by technology development efforts. A CMB Polarization satellite would provide a definitive full sky map of the CMB polarization, probing scales not accessible from the ground. It would have unprecedented sensitivity, a result of the absence of the atmosphere or a warm telescope. The most critical element of a polarization experiment, namely the control of sources of systematic errors, can best be achieved on a satellite platform.

Technologies that are necessary for a successful polarization mission are on hand and are now being field-tested by a number of ground- and balloon-based CMB instruments. These instruments will provide critical feedback for the design and technology choices for the satellite. They will also give key information about astrophysical foregrounds and control of polarimetric systematic effects.

Satellite Support

The Primordial Polarization Program Definition Team and the scientists signed below endorse a program of technology development and ground and balloon experiments that will lead to a CMB Polarization satellite as soon as feasible. We urge NASA, NSF, DOE and NIST to fund to its fullest the technology development and array of ground and balloon instruments that are a necessary step for the implementation of a CMB Polarization mission. We call upon NASA to set high priority for funding its Inflation Probe mission.