

# Planning for the Decadal: Space, Balloons and CMB-S4

August 2017

# Broad Context - Prep for Decadal 2020

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- Communicate breadth of science goals: those we own (r, Neff), those that also appeal to the broader astrophysics community
- Present a compelling plan to the agencies, specifically both NSF and NASA
- Clarify how all components work together, ground, balloons, space

# NASA Prep for 2020

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- Set up 8 Probe Mission Studies
  - Probe= \$400M-\$1000M
  - One `Inflation Probe' (CMB) study: Probe of Inflation and Cosmic Origin = PICO (?)
- Studies will produce 50 pg. reports + cost estimates that will be submitted to NASA and to the Decadal Panel
- Desired/Likely outcome: Panel recommends a funding wedge. Probes are then competed.

# Broad Context - Prep for Decadal 2020

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- NASA only invests in technology development or balloon payloads that lead to a (possible) future space mission.
- Over the years NASA has spent significant resources in CMB activities (space, balloons, tech development) because there was a mission in the future.
- NASA invests only in what the decadal panel recommends
- Many of us (most? all?) recognize the strengths of a future CMB space mission, the complementarity with sub-orbital, and of keeping NASA engaged with CMB

# Tomorrow

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- How do we strengthen the case for S4 and for space (and balloons) vis-a-vis decadal panel
- What is the coherent message we want to relay?  
How do we arrive to this coherent message?

Additional Slides

# PICO Information

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- Steering Committee: Bennett, Dodelson, Page
- Executive Committee: Borrill, Bock, Crill, Devlin, Flauger, Jones, Hanany, Knox, Kogut, Lawrence, McMahon, Pryke, Trangsrud - Weekly Telecons
- 7 working groups: fundamental physics (Flauger), extragalactic science (Battaglia), galactic science (Chuss), data challenge (Knox), Imager (Hanany), Spectrometer (Kogut), Systematics (Crill), [Technology (McMahon)] - Weekly/Periodic Telecons
- Wiki: <https://z.umn.edu/cmbprobe>
- Mailing list: [cmbprobe@lists.physics.umn.edu](mailto:cmbprobe@lists.physics.umn.edu)

# Space mission + S4: how to strengthen both?

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- Highlight complementarity in relevant reports
  - CDT; PICO study; S4 Science Book V2; S4 whitepaper(?);
- Highlight common technologies + cross-fertilization in technology development; recommend participation of all agencies in developing the technologies
- Option: common workshop
  - part of next S4 meeting?
  - 1 of 2.5(?) days
  - describe design of PICO, science capabilities + targets, discuss science complementarity (what can be achieved with both data sets), discuss technology development for both efforts



# Additions

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- Decadal: NASA is the third leg
- Coordinated message:
  - AI: real concern is when we're interfacing with S4. Both S4 and Probe concept need to be careful to give the same message, lest NASA HQ decides that only one is needed. Including things ground doesn't get us that space does. Don't want HQ to think that the CMB community thinks a ground mission alone can get the full range of science.
  - AI: It is important that both ground based and NASA side are saying the same thing. Don't want mixed messages. Maybe be best couched in terms of sigmas - sigmar, sigmanf

