

## IPSIG Telecon Summary

### Overall Conclusions

There is a broad consensus on the following elements:

- A white paper is timely
- The white paper should provide overall strategy for a path forward, not dwell on particular technical details.

### Details (in chronological order; regrets if not everyone's comments are included)

Shaul - background: NASA, PhysPAG-EC are looking for feedback about the bicep2 measurement, and what should happen next. Decadal panel ranked CMB technology development as third priority (in the constrained budget case), until review by DSIAC by mid-decade; NASA hardly has funding for second priorities. CAA and NRC retain DSIAC role. Proposal: IPSIG will write and submit a white-paper (WP) putting the bicep2 measurement in context. Paper will be submitted through PhysPAG-EC to Astrophysics Subcommittee (APS). Outline has been circulated by e-mail.

Rita - Once paper goes to APS the audience is broader, e.g. CAA.

Jamie - WP is more complicated if it is directed to CAA, rather than to NASA. Suggest to concentrate on NASA as the client.

Charles - WP should point out the transformative nature of the measurement.

John R. - Is it clear now that there is a stronger case for a satellite?

Jamie/AI - We are in the situation the decadal anticipated. We have first detections, now need solid confirmation and characterization of the signal. These are exactly the conditions that warrant consideration of a space mission.

John R. - But the case for a satellite may not be strong enough because it's very difficult to do a measurement that distinguishes between the slow roll value of  $n_t$  and zero.

Shaul - I See this WP as charting a path for how to make the decision about the satellite, not the decision itself, which we should leave for later.

Jamie - Needs to be stronger; If  $r=0.2$ , state why does it argue for future space measurements.

AI - For the decadal the community was saying that we should wait for hints of signal before moving forward because there was a risk of null result. The bicep2 measurement removes this risk. We shouldn't now say that we need to wait for more.

Shaul - Clarify: not suggesting to wait, or get more evidence. If  $r=0.2$  there is a case for a satellite. We should write the WP now, and set the path for a mission study that would analyze all possible options by the time there is confirmation/validation.

John R.- What is the time scale for validation? What do we expect from Planck?

Jamie - Time scale for confirmation is quick. Planck in October. If Planck doesn't have sufficient sensitivity then cross-correlation with bicep should have plenty of sensitivity. We should lay out the timeline in the WP.

John R.- It is most important to highlight continued support for sub-orbital and technology development, as well as why it is important to continue precision measurements of  $r$ .

Asantha - from the theory side, it is a mistake to concentrate just on  $nt$ . We simply need to characterize the signal from  $\ell = 2-300$  as well as we can. Best limit is from an all sky measurement.

Shaul - The WP that we want to write within the next month should not delve into the various scientific trade-offs of a space mission, or whether we actually recommend a space mission. This would be the role of a future mission study.

Charles - The key elements are: there will be substantial progress in the next few years; situation is now different than in early decade; we are in the situation envisioned by the decadal; we need to put in motion actions to capitalize on these developments; lay out the estimate for confirmation; and the actions and outcomes that derive from that. Also put in context of Explorer in 2017. Need to make sure that NASA supports technology development.

Jamie - Also need to remember the international context. NASA may lose this satellite opportunity to the Europeans. We should call out the urgency to study options for CMB right now.

Shaul - M4 opportunity in Europe should be viewed as an opportunity for NASA to participate in a CMB mission in a substantive way.

Brad - As long as we are discussing technology development, should we be explicit about the technologies?

Shaul - We already have a technology roadmap from the early decade. Not sure that the role of the WP is to review/revise this roadmap. Such revision should be done within the work of a mission study.

Al/Charles/Julian - Agree that WP should focus on overall strategy not technical details.

Shaul - How do people see the synergy with CMB-S4?

Al - Satellite has access to large angular scale. Ground has access to small angular scale. There is complementarity.

John R. - Satellite has access to reionization bump, ground is good for  $\ell > 50$ .

Bill J. - Much broader frequency coverage available from a satellite

Shaul - Suggest tighter coordination with CMB-S4.

Kent - Should we submit the WP to P5?

Shaul - Timescale doesn't work out. We will finish the WP roughly by the time that P5 will finish its report, which is scheduled to become public on May 22.

Kent - Should we wait for the results of P5 before we submit. If S4 is not strongly endorsed, this increases the need for NASA to step in.

Jamie - What are the logistics of the WP?

Shaul - The WP is relatively short. Please volunteer; otherwise we will solicit contributions. POC are Jamie and Shaul.