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Breakouts: Coordinating Chapter Interfaces in Science Book Notes

Uniformity in Analyses / Assumptions / Forecasts / Tools:

- Use CMB-S4 GitHub to share resources!
 - https://github.com/CMB-S4/StandardPlots
 - o Please use it if you are making a plot to be updated at a later date!
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- List of existing tools, codes, noise curves, etc:
 - DRAFT Tool (see also Chapter 5 breakout)
- Documentation for forecast assumptions:
 - Should there be an appendix in the Science Book devoted to this topic?
 - Noise curves
 - TT, EE, BB
 - Lensing Reconstruction
 - Will want separate TT, polarization lensing reconstruction noise to deal with foreground contamination
 - Per frequency
 - Post-ILC

?Are the input foreground models specified so people can compare different models? Yes.

One output of the code is the Cls for the foregrounds. Srini is currently creating a tutorial notebook for this. (https://github.com/sriniraghunathan/DRAFT/blob/master/tutorial.ipynb)

- Cross correlation noise included.
- Sky coverage
 - Wide survey
 - Delensing patches
 - f_sky and footprints
 - Cuts on stellar density
 - Cuts on dust
 - Masks for point sources?
 - Right now are using Gaussian realizations
 - Figure out masking thresholds for different analysis and also what plans are for map making (different groups different requirements)
- Combination with Planck / other surveys
- Cadence
 - Depth per map / day / week (is it a regular cadence or is it shifting throughout the year)
 - Background level and impact on point source detection
 - Schedule of visits to particular locations
 - Latency for transient source detection



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- Astrometric accuracy, distortions over the field of view and how calibratable these will be
- Beam size
- Galaxy survey properties
 - dN/dz
 - When collecting future galaxy surveys it will be important to understand overlaps in the sky.
 - Collecting fractions of the sky and survey info (some experiments hard to find, tbd: outreach to get planned survey masks)
 - Info to be collected and shared in github code/tools
- Do we have any forecasts where we need off diagonal terms in the covariance matrices?
 - There will be a sample script set up for S4 where these can be turned on/off (TT, TE, BB, EE, PhiPhi). What about PhiPhi x galaxies? (TBD, will depend on the final noise levels)

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- How to quote performance of other surveys:
 - Planck
 - o ACT / SPT
 - BICEP
 - o SO
- Feedback from the director's reviews has been to put other experiments in context. What's the plan for centralizing this information?
 - TBD: collect official numbers from other collaborations where possible. One large table/centralized location for this information and open needs would be valuable

CONTENT INTERFACES:

- Chapter breakdown does not directly align with AWG topics
 - Need to ensure that important topics do not fall through cracks
 - Want to avoid duplication of topics across chapters
- Suggestions for new figures:
 - Plot suggestions doc
 - o If there are helpful figures that you think should be included in the science book, please put examples of these into that doc to give people ideas for when generating new plots for the SB.
 - Standardization of the Science book figure formats (colors (incl. colorblind accessibility/printer-friendliness), font, sizes, etc); line to walk between being super rigid,v/s being flexible. Important to do in advance!

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- Chapter 4 Inflation
 - Non-Gaussianity
 - Primary CMB
 - Lensing galaxy (cosmic variance cancellation)
 - kSZ methods
 - Primordial P(k)
 - Primary, Lensing, Clusters
 - Isocurvature
 - Maps2Cl should be involved (is this in the book yet? in a BSM context, but not in the standard way as the Planck constraints on inflation paper maps2cell can add)
- Chapter 5 BSM
 - Birefringence



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- Isotropic / anisotropic
- Interface with BB
- Dark energy
 - Lensing, clusters, cross-correlations
 - How much to tackle in this science book? Was included at some level in SBv1, need to define the boundary conditions for this in this book.
- Dark matter
 - Primary, lensing, clusters, PS/galaxies/xcor
- Neutrino mass
 - Lensing, clusters, cross-correlations
- Chapter 6 Astrophysics with Secondaries
 - Reionization 2+4 pt -> neutrino mass
- Chapter 7 Persistent Sources
 - Overlaps with Galactic Science?
 - o Do mass loss mechanisms relate to or inform ISM studies in Chapter 9?
 - o Protoclusters clusters interface
 - Magellanic Clouds/other nearby galaxies, expertise is more in the galactic science group than the Sources WG; note to coordinate with Chapter 9 on this.
- Chapter 8 Transients
 - o FRB magnetar connection?
 - o Flare stars and stellar mass loss?
- Chapter 9 Galactic Science
 - Relate ISM / dust science to BB foregrounds for PGW

LOGISTICAL CONCERNS:

- To whom do contributors report?
 - o AWG leads -> Science council.
- What is the best venue for discussing progress?
 - Slack Channels for chapters
 - Cross working group phone calls
 - Frequency advertising for general S4 will get more minds involved.
- Who is responsible for smooth section transitions?
- Do we need to nominate liaisons / czars / interface coordinators?
- Contributor list:
 - o Per section?
 - Per subsection?
 - What is the threshold for appearing in a contributor list?
- What about publishing as individual chapters?
 - Was discussed, the idea was having stand alone chapters would require repeating assumptions.
 - Tom M look at the NGVLA science book, it stands as a bit of a counter example.
 - Might be worth reopening this discussion.
 - Kim disadvantage of publishing individual chapters makes it harder to find material.
 Public accessibility.
 - Ben And "speaking with one voice" and not several separated voices
 - Would be good to see examples of successful chapter by chapter so we can get a better feeling for what this looks like.
 - o Some of the publishers who do paper books might organize this for us.



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• Since science book won't be public by jobs cycle this fall, Science council happy to write a letter describing contributions to the science book.

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