Notes of the Euclid CMBXC Remote Meeting, March 25th, 26th, 2021
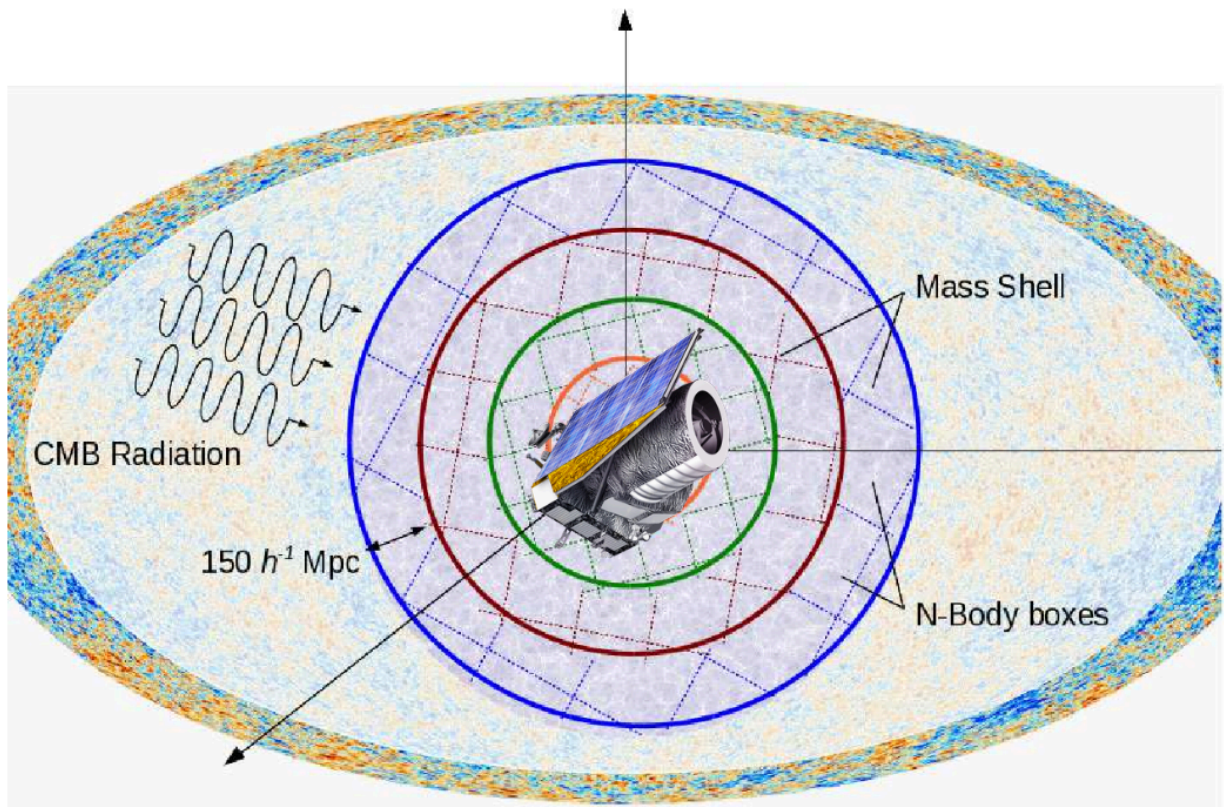
- Meeting website here:
  - https://indico.sissa.it/event/54/
- Notes in real time, of questions, comments, and topics for discussions, here:
  - https://docs.google.com/document/d/1ZcPI5IkmHI2Fa2goCT6JUBmtMqbSSREBrXq-l-MXwOk/edit?usp=sharing
- Meeting details and presentations stored on the wiki at
  - https://euclid.roe.ac.uk/projects/cxswg/wiki/CMBXC_Remote_Meeting_March_25th_26th_2021

Notes on Presentations and Discussions

Thursday, March 25th, Afternoon Sessions

Welcome Session, 13:30 - 14:00

- Nabila and Carlo give the introductory remarks, slides [here](#).

Notes:

- Nabila gives the presentation,
- Ken re: Launch vis-a-vis ROE7 : I have heard more like 8 months delay if we replace ROE7, which would imply launch in May…
- Carlo summarizes the content of the SPV3 for the topics which are the closest to our activities, and with Nabila encourages group members to join the activities,
- Carlo comments on the importance of having simulations linked with estimators & likelihood also as a positive item for SPV3 activities.

Simulations Session, 14:00 - 15:30

- Session organizers: Carmelita, Giulio, Marco, Matteo, Pauline
- Status report for KP2.2, slides available on the wiki of the meeting.

Notes:

- Matteo C., gives the presentation, Pipeline is presented,
- Carlo & Nabila, nice building blocks representation, Matteo also explains the color code,
- Nabila, Giulio, Matteo C. and Melita comment on the behavior of the bias with sources on DEMNuni, agreeing on the interpretation: shot noise effects that arise more for smaller redshifts of source-lenses,
- LensQUEST being used for validating lensing potential reconstruction, Louis also willing to help and others may be interested,

- Action: Explore different CMB cases not only S4, include (Adv)ACT(pol)
- Choice of SHAM vs HOD (implemented in flagship) TB explained in the paper
- Flagship choice for the SPV3 probably the choice they'll do. Same choice for the pape

ECSURV realization of the Wide survey (RSD 2020b)

14630.5 deg2
6.00 yr
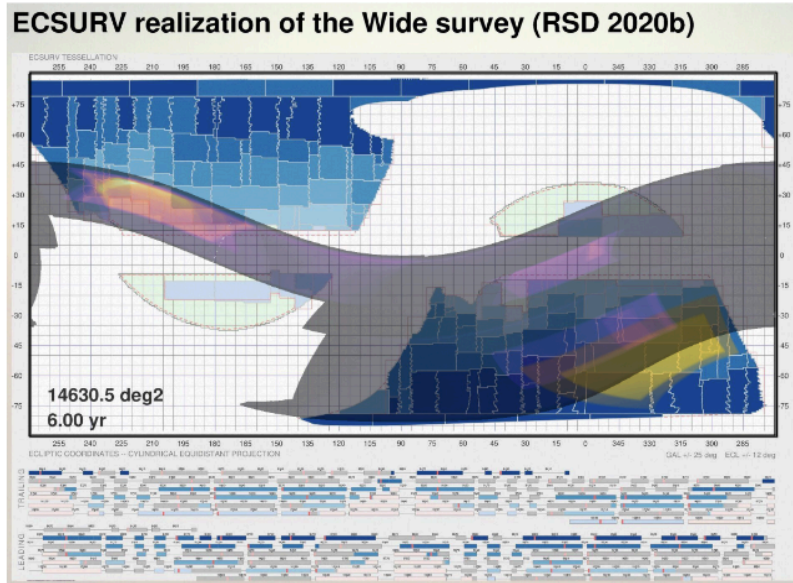
- No post-born approx at this stage (Not a priority wrt completing the suite of the observables). Same for RS effect. Same for variance. All are under discussion for the future
- Completing the observables on SZ and CIB through "halo", baryonification, AI … see/connect to sim groups

-

- Status report on Voids CMB Lensing Cross Correlations, postponed to the next telecon waiting for Pauline to come back.
- [May be for the last discussion Friday?] CMB Experiment Sky Coverage: I wasn't sure where to put this, so I put it here: This is similar to what I showed at a previous meeting, but I've updated it with ACT DR5 coverage. The "blue" background shows when Euclid will take data -- Dark Blue is the first year. Light Blue is the end of the mission. The yellow/gold in the lower right shows the SPT coverage, and the dark band with some purple and yellow is the ACT DR5 depth. This is already covered, and they will continue to observe this area for another year. In particular, they have already covered about ¼ of the sky Euclid will observe in its first year of observations. And there is a cluster catalog (I don't know about voids ;-).

Reports & Discussion Session, 16:00 - 17:00

- **ACTION**: Carlo & Nabila open a page in the wiki/google document where people keep note of their affiliations to groups other than CMBXC in Euclid in order to have a mapping of the group interfaces and synchronization.
- Timescale for the KP-paper [not all decisions taken, issue with post-processing, Dustgrain-SHAM could take longer] → first draft incomplete by Euclid-meeting @end May. **ACTION**: simulation team open the overleaf project, ask people to sign up on parts of the text to write.

- What are the other observables to be set up next → review of the other activities from sims [Giulio = lensing; Melita = clusters (Borgani et al. on DEMUNI & dustgrain);]
- Discussion on "material" from Simulations for Estimators & Likelihoods. Joint **ACTIONs** for Simulation and Est&Like WPs:
  - What data needed for the estimator development for iSW → inputs from estimators for (simulations team (Matteo, Melita, Marco, Giulio), with Marina, Max et al. for the likelihood and estimators) [population of galaxies in halos; redshifts,]. Melita has a master student starting on this.
  - What data needed for the estimator development for lensing (Matteo, Giulio, Melita, Louis et al. + likelihood groups)
- Covariances! → First step/priority Gaussian conv; 50 reslisations from DEMUNI quid different randomisation for increased number of mocks [help needed, Carlos volunteered]
- Reconstruction from CMB lensing in SO case with standard est.
- Access to the sim data from team members → TB considered only once the sims are validated and the paper is ready to accompany the description of the outputs
- ...

Friday, March 26th, Morning Sessions

Estimators & Likelihoods Session, 10:00 - 11:15

- Session Organizers and talks:
  - Marina: update on the outline paper
  - Alessandro G.: update on PCL/QML estimators and comparison
  - Max: updates on likelihood
  - Shahbaz: update on covariance & Gaussian likelihood
  - Alessandro R., Fabien,
- Status & plans of the KP3 / pre-launch paper 3.1

Notes:

- Marina introduces the overleaf structure of paper 3.1
- Nabila, Marina, we can set an action on the group to test alternative estimators if any (e.g. Needlets but also angular Xcorrel, etc.)
- Schedule for completion of the ISW-GC Estimators & Likelihood paper: early 2022.
- Action on the Limber approx evaluation ongoing
- Lowest l multipoles under control, efforts to go to Nside 64 for comparison with PCL,
- Discussion about the inclusion or not of the gg info in the estimate of the cosmological parameter
- Max gives update on Likelihood development,

- TG under checking also for Modified Gravity,
- Agreement to fork code development,
- Shabbaz reports on the Gaussian likelihood implementation,
- Discussion on the relevance of the TG spectra in relation to DE and MG studies, general agreement to push for the quantification of the relevance of TG on constraints as it belongs to CMBXC observables, and also in relation to SPV3 activities, ...

Topics for Discussions,

- **ACTION** to organize an IST:NL,
- Strategy for hybridization,
- Should/can we already decide between PCL & QML?
-
-
- ...

Reports & Discussion Session, 11:30 - 12:30

- Matteo and Valeria give an Introduction to the IST:L demo

Notes
- Valeria gives presentation of CLOE,
- Matteo presents the code toolbox,
- Requests of feedback on the installation and use or comments also
- Forking & mirroring can be the baseline,
- Luca, Max, Valeria, Matteo discuss on the efficient way of interfacing, independence is desired, taking care of avoiding replicating modules which are inside the CLOE and calling it for any operation which is in common,
- Luca, Valeria, stress that Shabbaz has already a CLOE version with TG module in and testing is in progress,

Topics for Final Discussion, …

Friday, March 26th, Afternoon Sessions

Extended Forecasts Session, 14:00 - 15:30

- Session Organizers: Daniela, Fabio, Louis, Stephane Alessandro G.,
- KP1.2 Resubmission,

Notes
- Review from Stephane of the answer to the 2 internal referees. All points addressed need to see the magnification issue
- Action: put a pdf of the revision in the wiki
-

Topics for Discussion, ...

- Update on Extended cosmological models forecasts,

Notes,
- Presentation from Fabio

Topics for Discussion, ...

- CMB Cross-Correlation in Scalar-Tensor Theories,

Notes,
- Nice result showing that the phi-g correlation provides similar SN than gg!

Topics for Discussion, ...

- EFT approaches in extended theories,

Notes, ...

Topics for Discussion, ...

- Extended forecasts beyond the IST framework and recipes.

Notes

- Presentation from Louis & Stephane
-

Topics for Discussion, ...

Summary Session, 16:00 - 17:00

- Summary of Previous Discussions, Decisions & Actions,
  - Discussion on Scan Area of Euclid vs CMB Surveys (Ken),
  - ACTIONs on Carlo & Nabila to map the WGs where people belongs to in order to maximize information and synchronization
  - Schedule for a first robust draft on Simulations (KP2.2): ==Euclid Consortium meeting end May.==
  - Schedule for a first draft on Estimators & Likelihood pre-launch paper (KP3.1), focused on ISW-g by coming fall, ==i.e. next WG meeting==.
  - ACTIONs on the Simulations and Likelihood and Estimators Teams to list Outputs of the Simulation Pipeline, desiderata for Estimators on ISW and Lensing:
    - Access of objects to simulations to be granted compatibly with:
      - Validation and work in progress,
      - KP2.2 development,
      - ...
    - Galaxy catalogues and details,
    - Halo numbers and details,
    - Power spectra and cross-spectra,
    - Maps of lensed CMB, lensing potential,
    - Covariances from sims → randomization tests volunteers needed Carlos!
  - iSW likelihood [internal]
    - Limber under study
    - QML-PCL wait for comparison Nside=64

- ○ Pathfinder Module of Tg integrated in CLOE is produced (Shahbaz) and undergoing testing, forking Likelihood Module for continuing development and keeping integration in the IST:L infrastructure
    - ■ ACTION on Carllo, Nabila, Max, Fabien to invite IST:NL representatives to our next Telecon,
- ○ CMB-lensing Likelihood, possibly relevant for SPV3 if in place, team work needed, exploiting experience on ISWg, also involving/volunteering: iSW people + Louis, Giulio, Pauline, Sandeep Haridasu, Melita, Mario, Julien, Maria
    - ■ ACTION: reconstruction method standard & mapping in iSW
- ○ Forecasts : ok for the exploration of some of the hypotheses.
- ○ Interface with theory: some project
- ○ Who/how interface with SPV3
- ○ ...
- Plans,
- Consortium Meeting, 24-28/05 or 30/08-03/09?
- Fall Meeting **IN PERSON**, dates? October 7 and 8? Location? Trieste? Roma? Others?

CG = Clusters of Galaxies
GC - V = Galaxy Clustering (GC) SWG - Voids WP
GC - AP = GC SWG - Additional probes WP
GC - Lik = GC SWG - Likelihood WP
GC - Ph = GC SWG - Photometric WP
TWG = Theory Working Group (any WP)
WL= Weak-Lensing SWG
CoS=cosmological simulations SWG

Name	CG	NISP	NIR	SIR	GC-LE3	GC - V	GC - AP	GC - Lik	IST:L	TWG	IST: NL	WL	CoS
													OU/SWG
Aghanim	X												
Baccigalupi									X				
Carbone	X				X	X		X	X	X	X	X	X
Renzi		X		X	X	X	X						
Ilic	X								X	X			
Ganga													
Escoffier						X	X	X					
Archidiacono	X							X		X	X		
Fabbian												x	x
Polenta			X										
Paoletti										x			
Carlos HM	X												
Lattanzi									X				
Finelli										x			
Legrand							X						