2021 Summer Collaboration Meeting

Report of Contributions

Contribution ID: **2** Type: **not specified**

Junior Member Closed Session

Tuesday, 10 August 2021 09:15 (30 minutes)

A closed session for junior members and non-members only convened by the Governing Board postdoctoral representative, Ben Schmitt.

See videoconference room link for connection details.

Presenter: SCHMITT, Benjamin (Harvard University;)

Contribution ID: **3** Type: **not specified**

Senior Member Feedback Session

Tuesday, 10 August 2021 09:15 (30 minutes)

This session will be held in parallel with the closed junior member feedback session. This is not a closed session, and all attendees are welcome to join.

We will discuss ideas for what kinds of programs we can or should support as a growing collaboration, and how to get more junior and senior members involved in these efforts.

Potential discussion topics include:
- How and when to start a mentorship program
- How to support people writing proposals for CMB-S4 related funding
- How to get more people engaged in CMB-S4 governance
- How to support members applying for faculty positions

Hosted by:
Darcy Barron (chair of Junior Scientist Advancement Committee)
Lindsey Bleem (chair of Governing Board)
Sara Simon (chair of Equity, Diversity, and Inclusion committee)

Presenters: BARRON, Darcy (University of New Mexico); BLEEM, Lindsey (Argonne National Laboratory & KICP); SIMON, Sara (Fermilab)

Contribution ID: **8** Type: **not specified**

Discussion Session With EDI Committee

Monday, 9 August 2021 13:30 (30 minutes)

Presenter: SIMON, Sara (Fermilab)

Contribution ID: **9** Type: **not specified**

EDI Event: Creating Communities of Care

Monday, 9 August 2021 11:10 (2 hours)

Learn how your individual actions, attitudes and behaviors can cultivate cultures of inclusion in the groups and organizations you join. This workshop session will cover principles of effective allyship, developing resiliency for ongoing diversity work, and skills for bystander intervention in the face of bias.

Notes/References:
- BIPOC: Black, Indigenous, & People of Color
- PBS documentary "Race: the Power of an Illusion", episode 3 on housing
- "Unpacking the Invisible Knapsack"by Peggy McIntosh

Presenters: PYER-PEREIRA, Tiana; SIDES, Vickie (U Chicago Staff)

Contribution ID: **10** Type: **not specified**

EPO Event - Teen Jeopardy

Wednesday, 11 August 2021 16:00 (1 hour)

Are you READY! We are launching our first-ever CMB-S4 Jeopardy Night! Are you up for an evening of physics fun? Join us for an evening filled with science research challenges. What a great way to represent your high school and win fun prizes! CMB-S4 scientists will be joining you to share stories about their career paths and prepare you for VICTORY! Let the Games Begin!

Register at: https://forms.gle/sMv7pMaCGuYh3ccX7

Contribution ID: **12** Type: **not specified**

Welcome & Logistics

Monday, 9 August 2021 08:00 (15 minutes)

Presenter: BORRILL, Julian (Lawrence Berkeley National Laboratory & UC Berkeley)

Session Classification: Plenary

Contribution ID: **13** Type: **not specified**

Collaboration Update

Monday, 9 August 2021 08:15 (1h 10m)

Presenters: CRITES, Abigail (University of Toronto;Dunlap Institute); REICHARDT, Christian (University of Melbourne); BISCHOFF, Colin (University of Cincinnati); BARRON, Darcy (University of New Mexico); TUCKER, Gregory (Brown University); MEYERS, Joel (Southern Methodist University;); CARLSTROM, John (University of Chicago;Argonne National Laboratory); BORRILL, Julian (Lawrence Berkeley National Laboratory & UC Berkeley); HUFFENBERGER, Kevin (Florida State University); BLEEM, Lindsey (Argonne National Laboratory & KICP); KNOX, Lloyd (UC Davis); HLOZEK, Renee (University of Toronto); SIMON, Sara (Fermilab)

Session Classification: Plenary

Contribution ID: **14** Type: **not specified**

Poster Fireslides

Monday, 9 August 2021 10:00 (5 minutes)

Presenter: Dr SALATINO, Maria (Stanford University;)

Session Classification: Plenary

Contribution ID: **15** Type: **not specified**

Project Update

Monday, 9 August 2021 10:05 (35 minutes)

Presenter: CORLETT, John (Lawrence Berkeley National Laboratory)

Session Classification: Plenary

Contribution ID: **16** Type: **not specified**

Conference Photo

Monday, 9 August 2021 10:40 (10 minutes)

Session Classification: Plenary

Contribution ID: **17** Type: **not specified**

EPO: Karsh STEM Scholars Program

Tuesday, 10 August 2021 08:00 (1 hour)

Ron H. Smith is the Director of the Howard University Karsh STEM Scholars Program. The Karsh STEM Scholars Program currently supports 122 STEM Scholars throughout their academic journey, with the goal of the Scholars receiving a Ph.D. in a STEM field. Students start in the program during their undergraduate years and continue through the completion of their graduate degree. In this session, Mr.
Smith will highlight this award-winning program by sharing the vision for the program and how it developed. He will also highlight the prestigious accomplishments of the program's Scholars.

The Howard University Karsh STEM Scholars Program received the 2020 Inspiring Programs in STEM Award from INSIGHT Into Diversity magazine, the largest and oldest diversity and inclusion publication in higher education. This Award honors colleges and universities that encourage and assist students from underrepresented groups in their pursuit of careers in the
fields of science, technology, engineering, and mathematics.

Primary author: SMITH, Ronald (Howard University)

Presenters: CROWELL, Juliet (University of Chicago;); SMITH, Ronald (Howard University)

Session Classification: Plenary

Contribution ID: **18** Type: **not specified**

Fireslides

Tuesday, 10 August 2021 09:00 (15 minutes)

Presenter: LEITNER, Matthaeus (Lawrence Berkeley National Laboratory)

Session Classification: Plenary

Contribution ID: **19** Type: **not specified**

Closeout

Friday, 13 August 2021 12:25 (15 minutes)

Presenters: CARLSTROM, John (University of Chicago;Argonne National Laboratory); BORRILL, Julian (Lawrence Berkeley National Laboratory & UC Berkeley)

Session Classification: Plenary

Contribution ID: **20** Type: **not specified**

eRosita

Thursday, 12 August 2021 11:10 (15 minutes)

Presenter: GHIRARDINI, Vittorio (Max Planck Institute MPE)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **21** Type: **not specified**

SPTxDES Cluster Cosmology

Thursday, 12 August 2021 11:25 (15 minutes)

Presenter: BOCQUET, Sebastian (LMU Munich)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **22** Type: **not specified**

CF3. Dark Matter: Cosmic Probes

Thursday, 12 August 2021 11:10 (15 minutes)

Presenter: DRLICA-WAGNER, Alex (Fermilab/UChicago)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **23** Type: **not specified**

CF4. Dark Energy and Cosmic Acceleration: The Modern Universe

Thursday, 12 August 2021 11:25 (15 minutes)

Presenter: SLOSAR, Anze (Brookhaven National Laboratory;)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **24** Type: **not specified**

CF5. Dark Energy and Cosmic Acceleration: Cosmic Dawn and Before

Thursday, 12 August 2021 11:40 (15 minutes)

Presenter: SHOEMAKER, Deirdre (UT Austin)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **25** Type: **not specified**

CF6. Dark Energy and Cosmic Acceleration: Complementarity of Probes and New Facilities

Thursday, 12 August 2021 11:55 (15 minutes)

Presenter: SCHLEGEL, David (Lawrence Berkeley National Lab)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **26** Type: **not specified**

The Galactic ISM in 3D: Plenary Introduction

Wednesday, 11 August 2021 10:35 (15 minutes)

Presenter: HENSLEY, Brandon (Princeton University)

Session Classification: The Galactic ISM in 3D

Contribution ID: **27** Type: **not specified**

CF7. Cosmic Probes of Fundamental Physics

Thursday, 12 August 2021 12:10 (15 minutes)

Presenter: FANG, Ke (University of Wisconsin-Madison)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **28** Type: **not specified**

The Galactic ISM in 3D: Plenary Summary Report

Thursday, 12 August 2021 09:10 (35 minutes)

Presenter: PANOPOULOU, Gina (Caltech)

Session Classification: The Galactic ISM in 3D

Contribution ID: **31** Type: **not specified**

TF09: Astro-particle physics and cosmology

Thursday, 12 August 2021 12:45 (15 minutes)

Presenter: GREEN, Daniel (UC San Diego)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **32** Type: **not specified**

Discussion

Thursday, 12 August 2021 13:00 (1 hour)

Presenter: DODELSON, Scott (Carnegie Mellon University)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **33** Type: **not specified**

Synergies of Large Scale Structure Surveys with CMB-S4: Plenary Introduction

Tuesday, 10 August 2021 10:05 (15 minutes)

Presenter: SCHAAN, Emmanuel (Lawrence Berkeley National Laboratory;)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **34** Type: **not specified**

Messengers from the Early Universe: Plenary Introduction

Tuesday, 10 August 2021 10:20 (15 minutes)

Primary author: MEYERS, Joel (Southern Methodist University;)

Presenter: MEYERS, Joel (Southern Methodist University;)

Session Classification: Messengers from the Early Universe

Contribution ID: **35** Type: **not specified**

The Time-Varying mm-Wave Sky: Plenary Introduction

Tuesday, 10 August 2021 10:35 (15 minutes)

10 min talk + 5 min Q&A

Presenter: HO, Anna (UC;LBL)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **36** Type: **not specified**

Synergies of Large Scale Structure Surveys with CMB-S4: Plenary Summary Report

Wednesday, 11 August 2021 08:00 (35 minutes)

Presenter: NICOLA, Andrina (Princeton University)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **37** Type: **not specified**

Messengers from the Early Universe: Plenary Summary Report

Wednesday, 11 August 2021 08:35 (35 minutes)

Primary author: CRAIG, Nathaniel (UC Santa Barbara)

Presenter: CRAIG, Nathaniel (UC Santa Barbara)

Session Classification: Messengers from the Early Universe

Contribution ID: **38** Type: **not specified**

The Transient Radio Sky

Wednesday, 11 August 2021 09:10 (25 minutes)

20 min talk + 5 min Q&A

Presenter: HALLINAN, Gregg (Caltech)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **39** Type: **not specified**

Backlighting the Baryons with CMB-S4: Plenary Introduction

Wednesday, 11 August 2021 10:05 (15 minutes)

Presenter: FERRARO, Simone (Lawrence Berkeley National Laboratory)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **40** Type: **not specified**

Gravitational Waves: Plenary Introduction

Wednesday, 11 August 2021 10:20 (15 minutes)

Presenter: FLAUGER, Raphael (UC San Diego)

Session Classification: Gravitational Waves

Contribution ID: **41** Type: **not specified**

Backlighting the Baryons with CMB-S4: Plenary Summary Report

Thursday, 12 August 2021 08:00 (35 minutes)

Presenter: LEAUTHAUD, Alexie (UCSC)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **42** Type: **not specified**

Gravitational Waves: Plenary Summary Report

Thursday, 12 August 2021 08:35 (35 minutes)

Primary author: SHANDERA, Sarah (Pennsylvania State University;)

Presenter: SHANDERA, Sarah (Pennsylvania State University;)

Session Classification: Gravitational Waves

Contribution ID: **43** Type: **not specified**

From the Dark Ages to Reionization with CMB-S4: Plenary Introduction

Thursday, 12 August 2021 10:05 (15 minutes)

Primary author: ALVAREZ, Marcelo (Lawrence Berkeley National Laboratory)

Presenter: ALVAREZ, Marcelo (Lawrence Berkeley National Laboratory)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **44** Type: **not specified**

Astrophysics and Cosmology with Galaxy Clusters: Plenary Introduction

Thursday, 12 August 2021 10:20 (15 minutes)

Presenter: RAGHUNATHAN, Srinivasan (NCSA)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **45** Type: **not specified**

Snowmass Planning and CMB-S4: Plenary Introduction

Thursday, 12 August 2021 10:35 (15 minutes)

Presenter: CHANG, Clarence (Argonne National Laboratory;University of Chicago)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **46** Type: **not specified**

From the Dark Ages to Reionization with CMB-S4: Summary Report

Friday, 13 August 2021 08:00 (35 minutes)

Primary author: Dr XU, Zhilei (MIT)

Presenter: Dr XU, Zhilei (MIT)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **47** Type: **not specified**

Astrophysics and Cosmology with Galaxy Clusters: Summary Report

Friday, 13 August 2021 08:35 (35 minutes)

Presenter: WU, Heidi (Boise State University)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **48** Type: **not specified**

Snowmass Planning and CMB-S4: Summary Report

Friday, 13 August 2021 09:10 (35 minutes)

Presenter: DODELSON, Scott (Carnegie Mellon University)

Session Classification: Snowmass Planning and CMB-S4

Contribution ID: **49** Type: **not specified**

Likelihood-approximations for large-scale CMB data

Friday, 13 August 2021 11:10 (15 minutes)

Upcoming large angular scale CMB surveys aim at measuring the scalar-to-tensor ratio r, to determine the energy scale of inflation, and the optical depth to reionization tau. To measure these systematics and noise dominated signals, flexible likelihood approximation techniques are required. We present novel methods from likelihood approximations to likelihood-free inference techniques and improved systematics modelling for CMB surveys.

Presenter: DE BELSUNCE, Roger (University of Cambridge)

Session Classification: Junior Scientist Talks

Contribution ID: **50** Type: **not specified**

Simulating and Mitigating the Atmospheric Effects for CMB ground-based Observations

Friday, 13 August 2021 11:25 (15 minutes)

In this talk, I will present the simulation status of the atmospheric effects for the LSPE/Strip telescope. In particular, I will emphasize how this technique can be easily applied at the other CMB ground-based experiments like QUBIC that will observe the CMB from the Atacama sky

Presenter: MANDELLI, Stefano

Session Classification: Junior Scientist Talks

Contribution ID: **51** Type: **not specified**

Forecasting Constraints on Squeezed-limit Non-Gaussianity Through μ-T Correlations Using CMB-S4 and SKA

Friday, 13 August 2021 11:40 (15 minutes)

Acoustic dampening of the cosmic microwave background (CMB) power spectrum results from imperfect photon-baryon coupling in the pre-recombination plasma. At redshift 5 × 104 < z < 2 × 106 , the plasma has an effective chemical potential, and energy injections from acoustic dampening in this era create μ- type spectral distortions of the CMB. These μ-distortions trace the underlying photon density fluctuations, probing the primordial power spectrum from 50 Mpc−1 < k < 104 Mpc−1 . Small-scale power modulated by long-wavelength modes from squeezed-limit non-Gaussianities introduces cross-correlations between CMB temperature anisotropies and μ-distortions. Under single-field inflation models, μT correlations measured from an observer in an inertial frame should be exactly zero, thus any measured correlation rules out single- field inflation models. We are forecasting how well CMB-S4 + SKA1 & 2 can constrain primordial squeezed- limit non-Gaussianity —parameterized by fNL—using measurements of C μT ‘ . Using current specifications and foreground modeling, we expect σ(fNL) ~ 5.

Presenter: ZEGEYE, David (University of Chicago)

Session Classification: Junior Scientist Talks

Contribution ID: **52** Type: **not specified**

Taurus: A Balloon-borne Polarimeter for Cosmic Reionization and Galactic Dust

Friday, 13 August 2021 11:55 (15 minutes)

Presenter: BENTON, Steven (Princeton University)

Session Classification: Junior Scientist Talks

Contribution ID: **53** Type: **not specified**

B-mode constraint from SPIDER's first flight with SMICA: a spectral based component separation pipeline.

Friday, 13 August 2021 12:10 (15 minutes)

Presenter: SHIU, Corwin (Princeton University;)

Session Classification: Junior Scientist Talks

Contribution ID: **54** Type: **not specified**

Talk 6

Session Classification: Junior Scientist Talks

Contribution ID: **55** Type: **not specified**

Talk 7

Session Classification: Junior Scientist Talks

Contribution ID: **56** Type: **not specified**

Talk 8

Session Classification: Junior Scientist Talks

Contribution ID: **57** Type: **not specified**

Talk 9

Session Classification: Junior Scientist Talks

Contribution ID: **58** Type: **not specified**

Talk 10

Session Classification: Junior Scientist Talks

Contribution ID: **59** Type: **not specified**

Introduction to Reionization

Thursday, 12 August 2021 11:10 (30 minutes)

The Epoch of Reionization (EoR) – when ultraviolet photons emitted by the first stars and galaxies transformed the intergalactic medium from mostly neutral to mostly ionized – is a primary science motivation of many current and upcoming facilities. The landscape of experiments is diverse, with some seeking a detection of the ionization field itself, and others instead going after the sources and sinks of ionizing photons. In this talk, I will briefly review the physics of reionization and the many ways in which it can in principle be constrained observationally. I will focus on the latest observational constraints and advances in theoretical modeling, and how the next generation of experiments can help fill key gaps in our current understanding of reionization, and ultimately, galaxy formation and cosmology.

Primary author: MIROCHA, Jordan (McGill University)

Presenter: MIROCHA, Jordan (McGill University)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **60** Type: **not specified**

Physical modelling of patchy reionization

Thursday, 12 August 2021 11:40 (15 minutes)

The epoch of cosmic reionization can be probed using the secondary anisotropies imprinted on the cosmic microwave background (CMB) temperature and polarization field. I will discuss the imprints of patchy reionization on the kSZ power spectrum and CMB B-mode polarization. I will introduce two new scaling relations to connect the kSZ and secondary B-mode power spectrum with the physics of reionization. I will discuss the advantage of a joint study of the kSZ signal and secondary B-mode polarization from CMB-S4 to get a better understanding of the epoch of reionization.

Primary author: MUKHERJEE, Suvodip (Institut d'Astrophysique de Paris;University of Amsterdam)

Presenter: MUKHERJEE, Suvodip (Institut d'Astrophysique de Paris;University of Amsterdam)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **61** Type: **not specified**

The high-redshift tail of stellar reionization in LCDM is beyond the reach of the low-ell CMB

Thursday, 12 August 2021 11:55 (15 minutes)

The first generation (Pop-III) stars can ionize 1-10% of the universe by z=15, when the metal-enriched (Pop-II) stars may contribute negligibly to the ionization. This low ionization tail might leave detectable imprints on the large-scale CMB E-mode polarization. However, we show that physical models for reionization are unlikely to be sufficiently extended to detect any parameter beyond the total optical depth through reionization. This result is driven in part by the total optical depth inferred by Planck 2018, indicating a reionization midpoint around z=8, which in combination with the requirement that reionization completes by z~5.5 limits the amplitude of an extended tail. To demonstrate this, we perform semi-analytic calculations of reionization including Pop-III star formation in minihalos with Lyman-Werner feedback. We find that standard Pop-III models need to produce very extended reionization at z>15 to be distinguishable at 2-sigma from Pop-II-only models, assuming a cosmic variance-limited measurement of the low-ell EE power spectrum. However, we show that unless appealing to extreme Pop-III scenarios, structure formation makes it quite challenging to produce high enough Thomson scattering optical depth from z>15, tau(z>15), and still be consistent with other observational constraints on reionization.

Primary author: WU, Xiaohan (Harvard CfA)

Presenter: WU, Xiaohan (Harvard CfA)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **62** Type: **not specified**

Constraining reionization with the CMB optical depth fluctuation - Compton-y cross-correlation

Thursday, 12 August 2021 13:00 (15 minutes)

In the era of the high-precision CMB measurements, in addition to the conventional power spectrum, other observables will help to constrain cosmology. For example, the gravitational lensing effect introduces correlations between different modes of CMB fluctuations. This mode-mode correlation has been used to reconstruct gravitational lensing from CMB data. Other secondary effects could also produce a similar mode-couplings in CMB. In this talk, I will introduce my recent works on constraining reionization through the optical depth fluctuations which cause another type of mode-mode correlation in CMB anisotropies. I will present the first measurement of the cross-correlation between optical-depth fluctuations — Compton-y map for constraining reionization with Planck data.

Primary author: NAMIKAWA, Toshiya (University of Cambridge;)

Presenter: NAMIKAWA, Toshiya (University of Cambridge;)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **63** Type: **not specified**

Cross-correlating patchy kSZ with other probes of reionization

Thursday, 12 August 2021 12:45 (15 minutes)

The kinematic Sunyaev-Zel'dovich (kSZ) effect contains a contribution from the inhomogeneous reionization process, and encodes valuable information about how reionization progressed. We examine several upcoming opportunities for cross-correlating the kSZ signal with other probes of Cosmic Dawn and the Epoch of Reionization. Specifically, we look at the 21cm signal, measured by radio interferometers such as HERA and the SKA, and wide-field high-redshift galaxy surveys, such as those from the Nancy Grace Roman Space Telescope. We show that in the sample variance-limited regime, a statistically significant cross-correlation signal is present. However, contamination from other signals, such as the primary CMB, may present observational difficulties. In particular, the foreground contamination for the 21cm signal presents a unique challenge that must be overcome to make a detection. We talk about potential methods for overcoming these difficulties, as well as prospects for future experiments.

Primary author: LA PLANTE, Paul (UC Berkeley)

Presenter: LA PLANTE, Paul (UC Berkeley)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **64** Type: **not specified**

Status of Reionization-Era Line Intensity Mapping

Thursday, 12 August 2021 12:10 (15 minutes)

Recent years have seen an explosion in the number of line intensity mapping experiments, particularly those targeting the Epoch of Reionization. By targeting unresolved emission of a variety of spectral lines, these surveys will provide new windows into the nature of the high-redshift objects responsible for ionizing the interstellar medium. In this talk, I will briefly summarize the status of current and near-future experimental efforts, explore the scientific results they hope to obtain, and highlight important open questions as we move into the next generation of cosmological surveys.

Primary author: BREYSSE, Patrick (New York University)

Presenter: BREYSSE, Patrick (New York University)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **65** Type: **not specified**

First Upper Limits from HERA on the 21 cm Power Spectrum

Thursday, 12 August 2021 13:15 (15 minutes)

In this talk, I will present the first power spectrum upper limits from the Hydrogen Epoch of Reionization Array (HERA), a purpose-built 21 cm experiment under construction in South Africa. I will highlight several of the supporting efforts—especially calibration and systematics mitigation—that build confidence in our result and in our instrument more generally. Finally, I will discuss how this milestone for the HERA team fits into our broader quest to detect and characterize the 21 cm power spectrum from the Cosmic Dawn and how such a measurement will complement CMB-S4.

Primary author: DILLON, Josh (UC Berkeley)

Presenter: DILLON, Josh (UC Berkeley)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **66** Type: **not specified**

Discussion

Thursday, 12 August 2021 13:30 (30 minutes)

Session Classification: From the Dark Ages to Reionization with CMB-S4

Contribution ID: **67** Type: **not specified**

Filaments, bubbles, super-bubbles, and other features of the magnetized solar neighborhood

Wednesday, 11 August 2021 11:55 (15 minutes)

Presenter: SOLER, Juan Diego (IAPS - Italian National Institute for Astrophysics)

Session Classification: The Galactic ISM in 3D

Contribution ID: **68** Type: **not specified**

Combining CMB Observations with Extinction Data to Create a 3D Dust Temperature Map

Wednesday, 11 August 2021 12:10 (15 minutes)

Presenter: ZELKO, Ioana (Harvard-CfA-UCLA)

Session Classification: The Galactic ISM in 3D

Contribution ID: **69** Type: **not specified**

Cosmological Constraints on Light (but Massive) Relics

Tuesday, 10 August 2021 11:10 (10 minutes)

Primary author: XU, Weishuang (Harvard)

Presenter: XU, Weishuang (Harvard)

Session Classification: Messengers from the Early Universe

Contribution ID: **70** Type: **not specified**

CMB S4: Gatekeeper of Dark Complexity

Tuesday, 10 August 2021 11:20 (20 minutes)

CMB measurements have unique and almost completely model-independent sensitivity to new light degrees of freedom. As a result, whole classes of dark sectors and dark matter models should produce a signal at CMB S4. Non-detection would severely constrain the space of possible solutions for fundamental puzzles like the nature of dark matter or the hierarchy problem. Positive detection would confirm physics beyond the Standard Model and lend strong motivation to non-minimal dark sectors, and I will outline the variety of exciting new astrophysical and cosmological signals that could be generated by such scenarios: formation of mirror stars and their signals in optical, X-ray, gravitational lensing or gravitational wave observations; direct detection of atomic dark matter with dark plasma screening effects in terrestrial experiments or stellar cooling; and combining full MHD N-body simulations of atomic dark matter with measurements of galactic structure to determine the forces active in the dark sector.

Primary author: CURTIN, David (University of Toronto)

Presenter: CURTIN, David (University of Toronto)

Session Classification: Messengers from the Early Universe

Contribution ID: **71** Type: **not specified**

CMB and BBN constraints on light thermally coupled WIMPs

Tuesday, 10 August 2021 11:40 (10 minutes)

Primary author: AN, Rui (University of Southern California)

Presenter: AN, Rui (University of Southern California)

Session Classification: Messengers from the Early Universe

Contribution ID: **72** Type: **not specified**

Discussion

Tuesday, 10 August 2021 11:50 (35 minutes)

Presenters: MEYERS, Joel (Southern Methodist University;); CRAIG, Nathaniel (UC Santa Barbara)

Session Classification: Messengers from the Early Universe

Contribution ID: **73** Type: **not specified**

Modulating fields and the CMB

Tuesday, 10 August 2021 12:45 (20 minutes)

Primary author: Prof. FAN, JiJi (Brown University)

Presenter: Prof. FAN, JiJi (Brown University)

Session Classification: Messengers from the Early Universe

Contribution ID: **74** Type: **not specified**

Probing Axion Couplings to Matter with N_{eff} Measurements

Tuesday, 10 August 2021 13:05 (10 minutes)

Primary author: WALLISCH, Benjamin (UC San Diego & Institute for Advanced Study)

Presenter: WALLISCH, Benjamin (UC San Diego & Institute for Advanced Study)

Session Classification: Messengers from the Early Universe

Contribution ID: **75** Type: **not specified**

The Cosmic Axion Background

Tuesday, 10 August 2021 13:15 (20 minutes)

In this talk I will show that we can detect relativistic axions that are a relic of the early Universe with instruments searching for axion dark matter. I will outline several forms such a cosmic axion background could take, demonstrate how the CaB would appear at an axion haloscope, and explain why current analyses would discard any emerging signal as a background.

Primary author: Dr RODD, Nicholas (CERN)

Presenter: Dr RODD, Nicholas (CERN)

Session Classification: Messengers from the Early Universe

Contribution ID: **76** Type: **not specified**

Discussion

Tuesday, 10 August 2021 13:35 (25 minutes)

Presenters: MEYERS, Joel (Southern Methodist University;); CRAIG, Nathaniel (UC Santa Barbara)

Session Classification: Messengers from the Early Universe

Contribution ID: **77** Type: **not specified**

Discussion

Wednesday, 11 August 2021 13:00 (1 hour)

Presenters: HENSLEY, Brandon (Princeton University); HERVIAS-CAIMAPO, Carlos (Florida State University;); PANOPOULOU, Gina (Caltech); ZELKO, Ioana (Harvard-CfA-UCLA); SOLER, Juan Diego (IAPS - Italian National Institute for Astrophysics); TAHANI, Mehrnoosh (National Research Council Canada); JELIC, Vibor (Ruder Boskovic Institute); GUAN, Yilun (University of Pittsburgh)

Session Classification: The Galactic ISM in 3D

Contribution ID: **78** Type: **not specified**

Understanding the mass and galaxy distribution in Clusters: A perspective from the edge of DM halos

Thursday, 12 August 2021 11:40 (15 minutes)

Presenter: ADHIKARI, Susmita (University of Chicago)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **79** Type: **not specified**

Synergy between optical, SZ, and X-ray: Lessons learned from DES Cluster Cosmology

Thursday, 12 August 2021 11:55 (15 minutes)

Presenter: Dr JELTEMA, Tesla (University of California, Santa Cruz)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **80** Type: **not specified**

Discussion

Thursday, 12 August 2021 12:10 (15 minutes)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **81** Type: **not specified**

Cluster science using the synergy between CMB-S4 and Lynx

Thursday, 12 August 2021 12:45 (15 minutes)

Presenter: Dr TREMBLAY, Grant (Harvard University)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **82** Type: **not specified**

Gas in the outskirts of galaxy clusters

Thursday, 12 August 2021 13:00 (15 minutes)

Presenter: BAXTER, Eric (University of Hawaii)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **83** Type: **not specified**

The ACT View of the Galactic Center

Wednesday, 11 August 2021 11:10 (15 minutes)

Presenter: GUAN, Yilun (University of Pittsburgh)

Session Classification: The Galactic ISM in 3D

Contribution ID: **84** Type: **not specified**

Baryon pasting + high-z cluster virialization models

Thursday, 12 August 2021 13:15 (30 minutes)

Presenters: NAGAI, Daisuke (Yale University;); Dr LAU, Erwin (Smithsonian Astrophysical Observatory); Dr AUNG, Han (Yale University)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **85** Type: **not specified**

Discussion

Thursday, 12 August 2021 13:45 (15 minutes)

Session Classification: Astrophysics and Cosmology with Galaxy Clusters

Contribution ID: **86** Type: **not specified**

Multi-tracers analysis of the Faraday tomographic data

Wednesday, 11 August 2021 11:25 (15 minutes)

Presenter: JELIC, Vibor (Ruder Boskovic Institute)

Session Classification: The Galactic ISM in 3D

Contribution ID: **87** Type: **not specified**

Reconstructing 3D magnetic fields associated with filamentary molecular clouds

Wednesday, 11 August 2021 11:40 (15 minutes)

Presenter: TAHANI, Mehrnoosh (National Research Council Canada)

Session Classification: The Galactic ISM in 3D

Contribution ID: **88** Type: **not specified**

GRBs 2: Millimeter Observations of Extragalactic Transients and Prospects for CMB-S4

Tuesday, 10 August 2021 11:35 (20 minutes)

The mm-band presents an exciting new discovery space for extragalactic transients, including supernovae, gamma-ray bursts, tidal disruption events, and fast & blue optical transients. I will set the stage via glimpses through the new window opened up by ALMA into the science of such transients, followed by prospects for their detection and characterization with upcoming CMB surveys.

Presenter: LASKAR, Tanmoy (University of Bath)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **89** Type: **not specified**

GRBs 1: Observations of GRBs in the mm range

Tuesday, 10 August 2021 11:15 (20 minutes)

In this talk I will give a brief description of the gamma-ray burst phenomena, will introduce the different types of progenitors, and the model that defines the electromagnetic emission of GRBs. I will focus particularly on the emission in the millimetre range and place this into the context of CMB-S4, giving examples of what we may expect to gain through the observations performed by the new observatory.

Presenter: DE UGARTE POSTIGO, Antonio (IAA-CSIC)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **90** Type: **not specified**

Stellar Flares 1: The Millimeter View of Stellar Flares

Tuesday, 10 August 2021 12:50 (20 minutes)

15 min talk + 5 min Q&A

Presenter: MACGREGOR, Meredith (University of Colorado Boulder)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **91** Type: **not specified**

Stellar Flares 2: The Panchromatic View of Stellar Flares

Tuesday, 10 August 2021 13:10 (20 minutes)

Talk by Rachel Osten

Presenter: OSTEN, Rachel (Space Telescope Science Institute)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **92** Type: **not specified**

Landscape of LSS surveys contemporary to CMB-S4

Tuesday, 10 August 2021 11:10 (15 minutes)

Presenter: SLOSAR, Anze (Brookhaven National Laboratory;)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **93** Type: **not specified**

Non-Gaussianity from CMB-S4 kSZ & LSS

Tuesday, 10 August 2021 11:25 (15 minutes)

Presenter: GIRI, Utkarsh (Perimeter Institute for Theoretical Physics)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **94** Type: **not specified**

Cosmology from CMB-S4 lensing x LSS

Tuesday, 10 August 2021 11:40 (15 minutes)

Presenter: ALONSO, David (Oxford University;)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **95** Type: **not specified**

Cosmology from Planck lensing x unWISE

Tuesday, 10 August 2021 11:55 (15 minutes)

Presenter: KROLEWSKI, Alex (Lawrence Berkeley National Laboratory)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **96** Type: **not specified**

Mapping Dark Matter to Sunyaev-Zel'dovich with Neural Networks

Tuesday, 10 August 2021 12:45 (15 minutes)

Presenter: THIELE, Leander (Princeton University)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **97** Type: **not specified**

TBD

Presenter: SCHAAN, Emmanuel (Lawrence Berkeley National Laboratory;)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **98** Type: **not specified**

Higher Order Statistics for CMBxLSS

Tuesday, 10 August 2021 12:10 (15 minutes)

Presenter: CAI, Yan-Chuan (University of Edinburgh)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **99** Type: **not specified**

Correlated simulations for CMB and LSS: overview

Tuesday, 10 August 2021 13:00 (15 minutes)

Presenter: LIU, Jia (UC Berkeley)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **100** Type: **not specified**

MillimeterDL: Deep Learning Simulations of the Microwave Sky

Tuesday, 10 August 2021 13:15 (15 minutes)

Presenter: HAN, Dongwon (Stony Brook University)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **101** Type: **not specified**

Discussion

Tuesday, 10 August 2021 13:30 (30 minutes)

Session Classification: Synergies of Large Scale Structure Surveys with CMB-S4

Contribution ID: **102** Type: **not specified**

Current measurements and future prospects: reconstructed velocities and halo thermodynamics

Wednesday, 11 August 2021 11:10 (20 minutes)

Presenter: SCHAAN, Emmanuel (Lawrence Berkeley National Laboratory;)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **103** Type: **not specified**

Projected fields kSZ

Wednesday, 11 August 2021 13:05 (20 minutes)

Presenter: KUSIAK, Aleksandra (Columbia University)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **104** Type: **not specified**

Review: baryon effects in weak lensing

Wednesday, 11 August 2021 11:50 (20 minutes)

Presenter: SCHNEIDER, Aurel (University of Zurich)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **105** Type: **not specified**

Discussion

Wednesday, 11 August 2021 12:10 (15 minutes)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **106** Type: **not specified**

SZ calibration of baryon effects

Wednesday, 11 August 2021 12:45 (20 minutes)

Presenter: HILL, Colin (Columbia)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **107** Type: **not specified**

Current measurements and future prospects: pairwise kSZ

Wednesday, 11 August 2021 11:30 (20 minutes)

Presenter: VAVAGIAKIS, Eve (Cornell University)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **108** Type: **not specified**

kSZ as a probe of ultralight axions

Wednesday, 11 August 2021 13:25 (10 minutes)

Presenter: GRIN, Daniel (Haverford College;)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **109** Type: **not specified**

Discussion

Wednesday, 11 August 2021 13:35 (25 minutes)

Session Classification: Backlighting the Baryons with CMB-S4

Contribution ID: **110** Type: **not specified**

The quest for the SGWB with terrestrial detectors

Wednesday, 11 August 2021 11:10 (18 minutes)

Presenter: REGIMBAU, Tania (LAPP/CNRS)

Session Classification: Gravitational Waves

Contribution ID: **112** Type: **not specified**

LISA and GW cosmology across 29 decades in frequency

Wednesday, 11 August 2021 11:29 (18 minutes)

Presenter: CALDWELL, Robert (Dartmouth College)

Session Classification: Gravitational Waves

Contribution ID: **113** Type: **not specified**

Beyond a measurement of the tensor-to-scalar ratio

Wednesday, 11 August 2021 11:48 (18 minutes)

Presenter: MEERBURG, Daan (University of Groningen;)

Session Classification: Gravitational Waves

Contribution ID: **114** Type: **not specified**

Measuring non-standard tensors with a BK-like experiment

Wednesday, 11 August 2021 12:45 (18 minutes)

Presenter: Prof. PRYKE, Clem (University of Minnesota)

Session Classification: Gravitational Waves

Contribution ID: **115** Type: **not specified**

Measuring the B-mode bispectrum from BICEP/Keck Array

Wednesday, 11 August 2021 13:03 (18 minutes)

Presenter: NAMIKAWA, Toshiya (University of Cambridge;)

Session Classification: Gravitational Waves

Contribution ID: **116** Type: **not specified**

Discussion

Wednesday, 11 August 2021 13:21 (39 minutes)

Session Classification: Gravitational Waves

Contribution ID: **117** Type: **not specified**

Towards precision measurements of the primordial GW background spectrum: the role of CMB and direct GW detectors

Wednesday, 11 August 2021 12:07 (18 minutes)

Presenter: CAMPETI, Paolo (Max-Planck-Institut für Astrophysik)

Session Classification: Gravitational Waves

Contribution ID: **118** Type: **not specified**

Career/Networking Hour

Session Classification: Gather.Town

Contribution ID: **119** Type: **not specified**

Introduction

Tuesday, 10 August 2021 11:10 (5 minutes)

Presenters: HO, Anna (UC;LBL); Prof. VIEIRA, Joaquin (University of Illinois at Urbana-Champaign;)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **120** Type: **not specified**

Discussion

Tuesday, 10 August 2021 11:55 (30 minutes)

For GRB science, what do we need in terms of:
- Alert stream contents & timescale
- Additional technical infrastructure / data products

Do we benefit from a higher-cadence experiment from the Pole? (Higher depth, higher cadence, longer revisit time)

Presenters: HO, Anna (UC;LBL); VIEIRA, Joaquin (University of Illinois at Urbana-Champaign;)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **121** Type: **not specified**

Introduction

Tuesday, 10 August 2021 12:45 (5 minutes)

- Review recent results from SPT & ACT
- Questions to bear in mind during the talks

Presenters: HO, Anna (UC;LBL); VIEIRA, Joaquin (University of Illinois at Urbana-Champaign;)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **122** Type: **not specified**

Discussion

Tuesday, 10 August 2021 13:30 (30 minutes)

For stellar-flare science, what do we need in terms of:
- Alert stream contents & timescale
- Additional technical infrastructure / data products

Do we benefit from a higher-cadence experiment from the Pole? (Higher depth, higher cadence, longer revisit time)

Presenters: HO, Anna (UC;LBL); VIEIRA, Joaquin (University of Illinois at Urbana-Champaign;)

Session Classification: The Time-Varying mm-Wave Sky

Contribution ID: **123** Type: **not specified**

A new 3D model of Galactic microwave foreground dust emission based on filaments

Wednesday, 11 August 2021 12:45 (15 minutes)

Presenter: HERVIAS-CAIMAPO, Carlos (Florida State University;)

Session Classification: The Galactic ISM in 3D

Contribution ID: **124** Type: **not specified**

The Time-Varying mm-Wave Sky: Recap

Wednesday, 11 August 2021 09:35 (10 minutes)

Presenter: HO, Anna (UC;LBL)

Session Classification: The Time-Varying mm-Wave Sky