

CF5: Dark Energy, Inflation and Neutrinos

Welcome to CF5

K. Honscheid

Dark Energy Overview

Inflation, Neutrinos Overview

S. Church

Dark Energy in the next Decade

M. Turner

CMB Science

U. Seljak



Information

- Agenda on Indico
<https://indico.fnal.gov/conferenceTimeTable.py?confId=6199#20130306>
- Cosmic Frontier Wiki
<http://www.snowmass2013.org>
- CF-5 Meeting Rooms
 - Kavli Auditorium
 - Redwood C/D, A/B (in ROB)
 - Sycamore (in Building 40)
 - Kavli Seminar Room

CF-5 Organization

Cosmic Frontier Charge:

The Cosmic Frontier working group is charged with summarizing the current state of knowledge and identifying the most promising future opportunities at the interface of particle physics, astrophysics, and cosmology.

Cosmic Frontier -> CF1, CF2, CF3, CF4, **CF5**, CF6



Cosmological Distances	(Alex Kim, Nikhil Padmanabhan)
Growth of Structure	(Dragan Huterer, David Kirkby)
Cross-Correlations	(Jason Rhodes, David Weinberg)
Novel Probes of Dark Energy	(Bhuvnesh Jain, Chris Stubbs)
Neutrinos	(John Carlstrom, Adrian Lee)
Inflation	(John Carlstrom, Adrian Lee)
+ Looking Ahead	



Sub-Group Details

Distances

Focus on SN and BAO

What DE constraints will MS-DESI and LSST provide?

Critical measurements not covered?

Beyond LSST: R&D or other projects

Novel Probes

Explore ideas for experiments/observations beyond the surveys

What are the current novel models for DE and MG?

What are the novel physical effects in these models?

What are the observational signatures?

What are promising theoretical avenues in the near future?



Sub-Group Details

Structure

Spatial distribution of LSS and its growth in cosmic time

What are the projected DE/MG constraints?

How to address cluster and weak lensing systematics?

What missing experiment could improve MG constraints a lot?

Cross Correlations

Combine multiple probes to extract additional information or to control systematics

What are the opportunities afforded by combining results from different probes?

What are the implications for experiment/survey design?

What theoretical developments are needed?



Looking Ahead

Strategic Planning Exercise:

Community Input → Snowmass
→ P5 → Facilities and Experiments

HEPAP Facilities Subpanel:

Draft reported next week (HEPAP meeting)
LSST and Next Dark Energy Experiment on initial list

Cosmic Frontier Workshop

Josh Frieman report

Looking Ahead sessions

Goal: Explore Ideas, Provide Input



Benchmark Models

- HEP and the DM community often do projections on benchmark models; goes beyond FoM and makes science more compelling (“Experiment X will distinguish between GR and this popular model of MG”)
- Current idea for benchmark models:
 - Quintessence ($w = -.95$)
 - Early DE (Doran-Robbers; Barotropic DE?)
 - Modified Gravity (Hu-Sawicki; exponential gravity?)
- Benchmarks lunch, Thursday @ Kavli 3 (find Scott Dodelson)



Deliverables & Goals

- Each group prepares ~20 pages for the CF-5 report
- Will go to the archive and possibly to a special edition of the Journal of Astroparticle Physics as "State of Dark Energy" publication
- Summarize the state of dark energy science
- Important to show exciting science opportunities and our excitement for this science
- Identify future opportunities

At the end of this meeting: Sub-group plans

Plans for Summer Meeting



White Papers

Dear Colleagues,

The Snowmass 2013 Community Summer Study on the future of high-energy physics encourages the submission of papers to its Electronic Proceedings. Submitted papers may be White Papers on specific topics or more technical contributions that illuminate questions asked by the study. We welcome anyone or any group in the international high-energy physics community to submit a paper to the study.

To submit a paper, please visit the web site:

<https://www-public.slac.stanford.edu/snowmass2013/>

Available CF-5 White Papers:

Rocky III Report, LSST DESC, DESpec, BigBOSS, KISS Workshop

If you consider submitting a white paper related to CF-5 we would prefer that you instead get engaged with one of the sub-groups and help with the sub-group report