

Welcome, Intro, and goals

PhysPAG January 2013 Meeting

S. Ritz
Chair, PhysPAG Executive
Committee

See
<http://pcos.gsfc.nasa.gov/physpag.php>

Includes email sign-up for news and
announcements. Reports from previous
meetings, links to APS reports, ...

The screenshot shows the homepage of the Physics of the Cosmos Program Analysis Group (PhysPAG). The header includes the NASA logo, the Goddard Space Flight Center name, and the title "Physics of THE COSMOS". A navigation menu at the top lists Overview, Projects, Science, Technology, Studies, Program Office, and Education. The main content area is divided into several sections: "Links" (listing various Study Analysis Groups like IPSAG, GWSAG, XRSAG, GammaSAG, CosmicSAG, and TechSAG), "Objective" (describing the group's role in supporting the PCOS program), "Upcoming Meetings" (listing a meeting on Sunday, January 6, 2013), "PhysPAG January Meeting Update" (announcing the meeting and a joint session with Paul Hertz), "Current draft agenda" (providing contact information for updates), "Past Meetings" (listing previous meetings in August 2012, January 2012, May 2011, and January 2011), "Executive Committee" (listing members like Steve Ritz, Jason Rhodes, and others), and "Contact" (listing Richard Griffiths). On the right side, there are sections for "Program News" (with dates from 2012) and "Project News" (with dates from 2012).

<http://pcos.gsfc.nasa.gov/physpag/>

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PCOS Science and Missions

- *Physics of the Cosmos spans the fields of high-energy astrophysics, cosmology, and fundamental physics, and includes a wide range of science goals. These include the following:*
 - **Expand our knowledge of dark energy**
 - **Precisely measure the cosmological parameters governing the evolution of the universe and test the inflation hypothesis of the Big Bang**
 - **Test the validity of Einstein's General Theory of Relativity and investigate the nature of spacetime**
 - **Understand the formation and growth of massive black holes and their role in the evolution of galaxies**
 - **Explore the behavior of matter and energy in the most extreme environments**
 - **Study the origin and acceleration of cosmic rays**
 - **Particle Signals of Dark Matter**

The screenshot shows the NASA website page for 'Physics of the Cosmos'. At the top, it features the NASA logo and the text 'National Aeronautics and Space Administration Goddard Space Flight Center'. Below this is a navigation bar with tabs for 'OVERVIEW', 'PROJECTS', 'SCIENCE', 'TECHNOLOGY', 'STUDIES', and 'PROGRAM OFFICE'. The main heading is 'Physics of the Cosmos' with a sub-heading 'Projects'. There are three main columns of content:

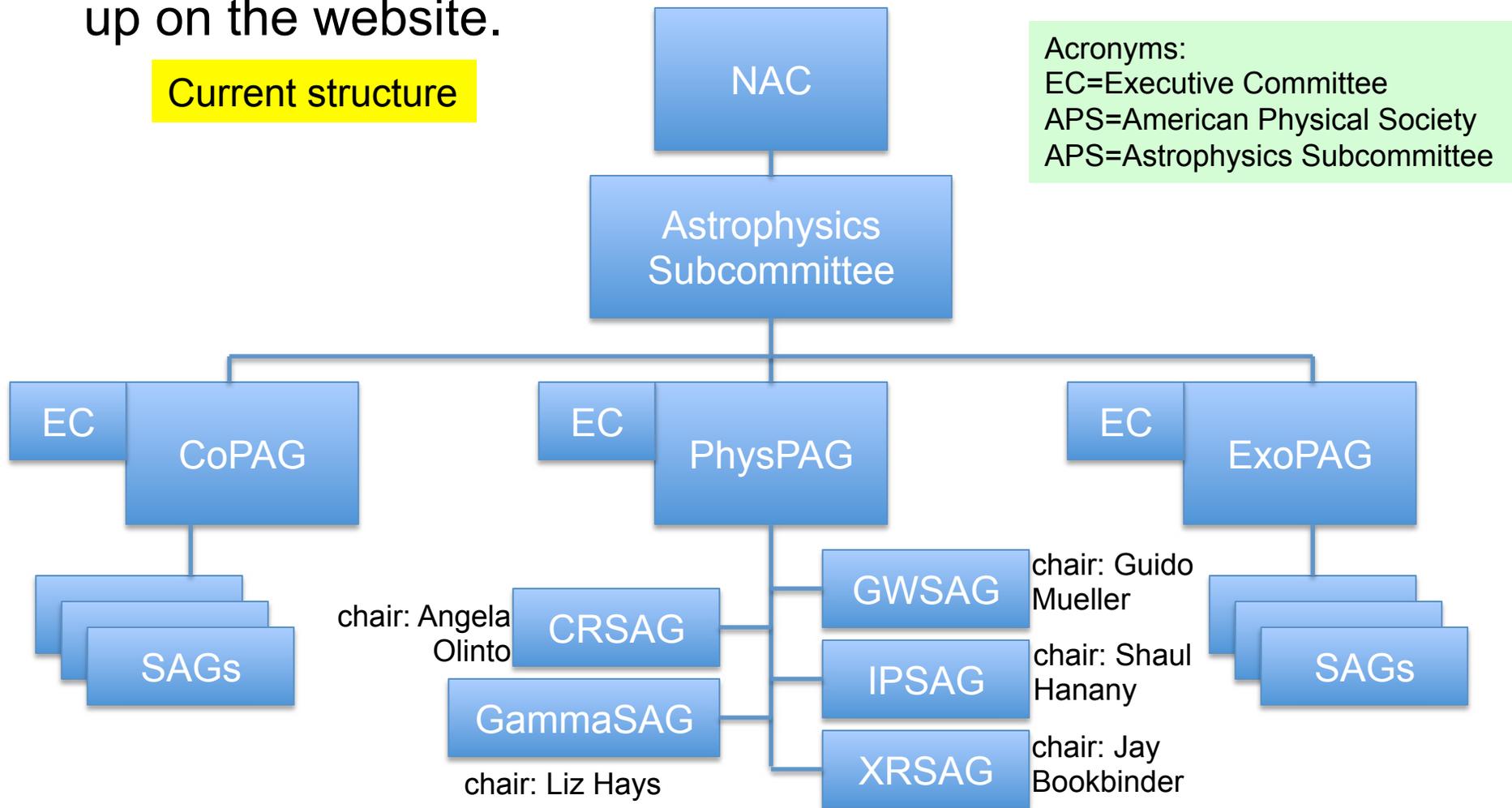
- Links:** A list of links including Documents, PhysPAG, COR Program Office, ExEP Office, Multimedia Library, and Sign up for PCOS News and Announcements.
- Operating Missions:** Three mission profiles are shown, each with an image and text:
 - Chandra X-ray Observatory:** Launch date: 23 July 1999. The Chandra X-ray Observatory, a NASA Great Observatory, provides the most detailed view to date of the X-ray universe. With its exquisite imaging capabilities and high spectral resolution scientists have investigated phenomena as diverse as the spectra of Jupiter's aurora, the effects of dark energy on the growth of galaxy clusters, and the properties of faint x-ray sources in deep fields.
 - Fermi:** Launch date: 11 June 2008. The Fermi Gamma-Ray Space Telescope (formerly GLAST) is providing our deepest and most detailed map of the gamma-ray sky. Fermi has recorded high-energy gamma rays produced by supernovae, pulsars, extreme flows of energy from systems powered by black holes, and gamma-ray bursts.
 - Planck:** Launch date: 14 May 2009. Planck Surveyor is an ESA-led mission that is making a precise, full-sky map of the Big Bang's cosmic microwave background (CMB). By measuring minute fluctuations in the CMB temperature and polarization at all angular scales, Planck will stringently test the theory of inflation, and will provide the most accurate information to date on the overall composition, shape, and early expansion history of the universe.
- Program News:** A list of news items with dates and brief descriptions:
 - 5 January 2012: Draft Agenda for PhysPAG Meeting at AAS in Austin, Texas, is posted.
 - 21 December 2011: X-ray Mission Workshop presentations are posted.
 - 1 December 2011: Second Issue of the Physics of the Cosmos Newsletter now available.
 - 1 December 2011: PCOS Program Annual Technology Report (PATR) now available.
- Project News:** A list of project news items:
 - Chandra News: 17 November 2011: NASA's Chandra Adds to Black Hole Birth Announcement.
 - Fermi News: 28 November 2011: In the Heart of Cygnus, NASA's Fermi Reveals a Cosmic-ray Cocoon.
 - Planck News: 27 April 2011: Andromeda's coat of many colours.
 - XMM-Newton News: 7 October 2011: XMM-Newton AO-11 Solicitation Closed.
- Related Missions News:** A list of related mission news items:
 - RXTE News: 28 September 2011: RXTE Special Session at January 2012 AAS Meeting: Abstract Deadline.
 - Suzaku News: 1 September 2011: Suzaku AO 7 Proposals Due on Nov 10, 2011.
 - Swift News: 25 October 2011: Now, There's an App for NASA's Swift Observatory.
- Previous Missions:** A link to previous missions.

see talk by Alan Smale

NAC, APS, PAGs, SAGs...

- PAGs provide opportunities for communication among communities and with NASA. Open membership – just sign up on the website.

Current structure



Current Executive Committee

- Jay Bookbinder (CfA)
- Shaul Hanany (Minnesota)
- Liz Hays (GSFC)
- Guido Mueller (UFL)
- Angela Olinto (U Chicago)
- Jason Rhodes (JPL)
- Steve Ritz (UCSC), chair

PhysPAG is much,
much more than the
EC!

physpag-ec@bigbang.gsfc.nasa.gov

Previous Meetings and Activities

- 2011 January AAS
 - defined first tasks: TechSAG, Inflation Probe SAG (IPSAG), build community outreach
- 2011 May American Physical Society Meeting
 - SAG reports and planning next steps, technology discussion with PCOS program office, LISA and IXO changes, possible GammaSAG, grow community and plan special sessions
- 2012 January AAS
 - Reports from TechSAG and IPSAG, discussions about next steps
 - Community Special Focus Sessions on X-ray and Gravitational Wave Opportunities in a Changing Landscape. Reports on NASA studies startup.
 - Three new SAGs proposed: GammaSAG, XRSAG, GWSAG. Approved by the NAC/APS. Start work at conclusion of studies (now!).
 - Idea for this (August) meeting
 - ...plus AAS Town Hall jointly with EXOPAG and COPAG
- 2012 August Jamboree 
- Many SAG and EC telecons, presence at topical meetings... including the 2012 April APS DAP business meeting
 - Successful proposal for Cosmic Ray CRSAG

PhysPAG August 2012 Agenda

TUESDAY, 14 AUGUST

COLUMBIA BALLROOM

- 08:30 WELCOME, PHYSPAG INTRODUCTION, MEETING PLAN – S. RITZ
- 08:45 NEWS FROM HQ – PAUL HERTZ (10+5)
- 09:00 PCOS PROGRAM BRIEF – ANN HORNSCHMEIER (15+5)
- 09:20 Q&A
- 09:30 COPAG REPORT (20+10) – C. MARTIN
- 10:00 ExoPAG REPORT (20+10) – S. GAUDI
- 10:30 BREAK *SEE NOTE REGARDING COFFEE
- 11:00 X-RAY STUDY RESULTS AND DISCUSSION (45+30) – R. PETRE
- 12:15 LUNCH
- 13:45 GW STUDY RESULTS AND DISCUSSION (45+30) – J. LIVAS/I. THORPE
- 15:00 OPPORTUNITIES FOR COSMIC RAY SCIENCE (20+10) – A. OLINTO
- 15:30 BREAK *SEE NOTE REGARDING COFFEE
- 16:15–18:00 PARALLEL SESSIONS
 - COLUMBIA BALLROOM 1: GWSAG – GUIDO MUELLER (CHAIR)
 - COLUMBIA BALLROOM 2: XRSAG – JAY BOOKBINDER (CHAIR)
- 18:00 ADJOURN

WEDNESDAY, 15 AUGUST

- 08:30–10:30 **DISCOVERY 2: DARK ENERGY FOCUS TOPIC PLENARY SESSION:**
 - RACHEL BEAN (VIA TELECON) – DARK ENERGY OVERVIEW AND THE BIG PICTURE
 - NEIL GEHRELS – WFIRST STATUS UPDATE (15)
 - PAUL SCHECHTER – WFIRST AND EUCLID SCIENCE (30)
 - DAVID WEINBERG – BEYOND WFIRST, LSST, AND EUCLID (30)
- 08:30–10:30 **COLUMBIA 2: IPSAG PARALLEL SESSION**
- 10:30 BREAK *SEE NOTE REGARDING COFFEE
- 11:00 **DISCOVERY 2: GROUP DISCUSSIONS WITH PAUL HERTZ**
- 12:00–13:30 LUNCH
- 13:30–18:00 PARALLEL SESSIONS
 - **DISCOVERY 2: DARK ENERGY FROM SPACE** – JASON RHODES (CHAIR)
 - **COLUMBIA 2: IPSAG** – SHAUL HANANY (CHAIR)
 - **DISCOVERY 1: GWSAG** – GUIDO MUELLER (CHAIR)
 - **COLUMBIA 1: XRSAG** – JAY BOOKBINDER (CHAIR)
 - **SATURN/VENUS: GAMMASAG** – LIZ HAYS (CHAIR)
- 18:00 ADJOURN

THURSDAY, 16 AUGUST

DISCOVERY

- 08:30 DARK ENERGY REPORT (20+10) – J. RHODES
- 09:00 GRSAG REPORT (20+10) – E. HAYS
- 09:30 IPSAG REPORT (20+10) – S. HANANY
- 10:00 BREAK *SEE NOTE REGARDING COFFEE
- 10:45 GWSAG REPORT (20+10) – G. MUELLER
- 11:15 XRSAG REPORT (20+10) – J. BOOKBINDER
- 11:45 FURTHER DISCUSSIONS – HQ, ALL
- 13:00 MEETING WRAP-UP, ADJOURN

198 Registered
Participants

<http://pcos.gsfc.nasa.gov/physpag/>

2012 August Breakout Sessions

XRSAG

Tues 08/14 - 14:00 - 15:30 - 1.5 hours

- Detailed update on the Concept Studies & Discussion – R. Petre (45 min + 15)
 - AXSIO, N-XGS, N-WFI, X-CAL, future missions
 - Recommendations from the study
 - Next steps
- Discussion on mission costings – lessons' observed and how to improve the process Daelmans/Bookbinder – (20 +10 min)

Wed 08/15 – 13:30 – 15:00 -1.5 hours

- Update on recent mission activities: Var - (30 min)
 - NuSTAR launch and first results
 - Astro-H status
 - Implications of GEMS cancellation - impact on the science and the communi
- Upcoming instrument/mission flight opportunities - MoO, SMEX, other? Open Discussion (15 min)
- International participations – TBD speaker & Open discussion (20 min)
 - L1 status and process: impact of non-selection of ATHENA & NGO & plan re-submittal
 - developing int'l collaborations - new ideas and approaches.
 - How to partner ESA (junior/senior partner)
 - Potentials for other countries: Brazil, China, India - risks and opportunities

Wed 08/15 - 15:30 – 17:30 -2 hours

- Technology Development planning – var. speakers
 - status of current efforts in optics – 30 min
 - status of current efforts in detectors – 20 min
 - Future needs for tech development – 20 min
 - near term – FY 13, 14
 - far term
 - Developing an integrated technology development plan/roadmap – 20 min
- And other potential sources of funding outside of the traditional (NASA/NSF)

16:00-16:45 The situation in Europe and the rest of the world (Danzmann)

- L1 process:
 - NGO Consortium construct
 - SSAC and SPC decisions
- L2/Cornerstone process:
 - NGO/eLISA Organization in Europe
 - Partnership options for Europe

16:45 - 17:00 Discussion

17:00 - 17:30 Role of the GW-SAG (GM, Someone from PCOS) 30min

- GW-SAG within PhysPAG
 - Depends on existence or non-existence of a Study team at GSFC/JPL and a GW-Science team
 - If GW-SAG is all, do we have to push for an expansion of number of supported people (travel support)?

08/15 Parallel Session GW SAG

13:30 - 15:00 Exploring options for the NASA

- Junior Partner with ESA
- Full partner with ESA
- Doing it alone
- China

in light of expected funding profiles

Different technology programs/plans for different options

- Being aware of ESA's way of doing business.
- How to prioritize technology plans?

15:30 - 17:30 How do we continue?

Wrap up

Physpag Meeting 15 August 2014

DE plenary Session 8:30 AM- 10:30 AM

Rachel Bean (via telecon): Dark Energy Overview and the Big Picture (30 mins)

Neil Gehrels : WFIRST status update (15 mins)

Paul Schechter: WFIRST and Euclid Science (30 mins)

David Weinberg: Beyond WFIRST, LSST and Euclid (30 mins)

Parallel Sessions:

Issues to be considered:

13:30-15:00

Benefit of an IFU on a dark energy mission (Greg Aldering)

Ground based projects (Gary Bernstein)

Computing Needs (Julian Borrill)

15:30-17:30

Technology needs (Jason Rhodes)

2.4M NRO WFIRST, benefits and advocacy (Gehrels and Schechter)

GWSAG

DE Session
Organized by
Jason Rhodes

Agenda

Time	Topic	IPSAG
8:00 – 8:30	Coffee	
8:30 – 8:45	Background (15 min) - Hanany	
	Bring the audience up to speed on recent IP history, decadal panel recommendations, status within NASA HQ, Goals of Workshop.	
8:45 – 9:35	Planck (40 min) – Lawrence + Crill Discussion (10 min)	
	What have we learned from Planck about technology, foregrounds, calibration and systematics.	
9:35 – 10:35	Progress by sub-orbitals: Balloons (25 min) - Jones Ground-based (20 min) – Lee Discussion (15 min)	
	What progress can we anticipate by sub-orbitals by the time of the mid-decade review? What else do we want to achieve by mid-decade and later in term of sub-orbital experiments?	
10:35 – 11:00	Break	
11:00 – 12:00	Meeting with Paul Hertz	
12:00 – 1:15	Lunch break	
1:15 – 2:25	CORE (15 min) - de Bernardis, EPIC (15 min) - Bock, PIXIE (15 min) - Kogut, LiteBIRD (15 min) – Hazumi Discussion (10 min)	
2:25 – 3:20	Technology development Detector Arrays and Focal Plane Coupling (25 min) - Moseley Multiplexing (15 min)- Irwin Discussion (15 min)	
	What are the key immediate areas for development? Where is the technology heading in the near term (<2015) and mid-term (>2015)?	
3:20 – 3:30	Break	
3:30 – 4:10	NASA HQ and Program office	

...plus GammaSAG
whitepaper organization
session

Lots of useful discussions...



Additional Points(1)

- This was a very useful meeting! Feedback (negative and positive) needed and very welcome.
 - what/who is missing? how can we optimize? please discuss in SAGs and/or send email to the EC: ec@bigbang.gsfc.nasa.gov
- Common themes:
 - **THE SCIENCE IS WONDERFUL!** (see summary talks this session)
 - Technology needs: scope, priorities
- PhysPAG is a crossroad. Expect great ideas, some disagreements.

16 August 2012

PhysPAG – S. Ritz

Additional Points(2)

- Connections with the other PAGs should be further strengthened to look for common opportunities. (XRSAG discussion)
- PhysPAG community inputs to the CAA. (There is some precedent, as the TechSAG gave inputs to the NRC technology roadmap study.)
 - Invite CAA members to our January PhysPAG meeting
 - Discuss with the NAC/APS and HQ appropriate modes of communication
- PhysPAG community inputs to HQ on the selection process for mid-decade strategic mission.
 - topic for the individual SAGs as well as PhysPAG
 - communicate through NAC/APS
- More details on 6 January meeting to follow soon.
 - reports from the SAGs; messages to APS
 - technology inputs planning, gathering; mid-decade planning
 - special focus topic sessions. suggestions welcome! (e.g., suborbital programs?)
- SR's term is up in 6 months. Would be good to name the next chair ASAP. Send suggestions for new PhysPAG chair to HQ.

6 January 2013

16 August 2012

PhysPAG – S. Ritz

6

Implementation Plan

<http://science.nasa.gov/researchers/sara/division-corner/astrophysics-division-corner/>

- NASA Town Hall Tuesday, January 8, 2013, 12:45pm-1:45pm

National Aeronautics and Space Administration



Astrophysics Implementation Plan

Astrophysics Division
Science Mission Directorate
NASA Headquarters

December 2012

Revision 1: typographical errors corrected 12/20/12

Astrophysics Implementation Plan

The 2010 decadal survey in astronomy and astrophysics, *New Worlds, New Horizons in Astronomy and Astrophysics*, recommended a coordinated program of research, technology development, ground-based facilities, and space-based missions to be implemented during 2012–2021 to address the most compelling science questions. However, the budgetary environment does not allow the recommendations of the decadal survey to be implemented as written. This *Astrophysics Implementation Plan* has been prepared by the Astrophysics Division of NASA's Science Mission Directorate to describe the activities currently being undertaken by the Astrophysics Division to respond to the decadal survey recommendations within the current budgetary constraints. One important goal of the Astrophysics Division is to begin a strategic mission, subject to the availability of funds, which follows from the decadal survey and is launched after the James Webb Space Telescope.

This is the Implementation Plan of the Astrophysics Division in the Science Mission Directorate at NASA Headquarters

A handwritten signature in black ink, appearing to read "P. Hertz".

Paul Hertz, Astrophysics Division Director

Today's Agenda

- Sunday, 6 January 2013 - Beacon B, Hyatt
 - 8:00-8:30 Informal discussions, wireless setup, etc.
 - 8:30-10:00 JOINT SESSION WITH OTHER PAG(s) - **Naples Ballroom I-II, Renaissance**
 - News from HQ - P. Hertz
 - Discussions with HQ and among PAGs
 - 10:30 Welcome, Intros, meeting goals - S. Ritz (10)
 - 10:40 News from the PCOS Program Office - A. Smale (20+10)
 - 11:10 Euclid Update - R. Griffiths (10+10)
 - 11:30 Technology Input Process and Issues [[PDF](#)] - T. Pham et al. (20+20)

 - 12:15-13:15 LUNCH

 - 13:15 XRSAG status and plans - J. Bookbinder (15+15)
 - 13:45 GWSAG status and plans - G. Mueller (15+15)
 - 14:15 IPSAG status and plans - S. Hanany & Jamie Bock (15+15)
 - 14:45 GammaSAG status and plans - TBA & E. Hays (10+10)
 - 15:05 CosmicSAG community inputs - Discussion (10)

 - 15:15 BREAK

 - 15:30 Discussion of issues, future meetings, summary slides - S. Ritz, all (30)
 - 16:00 WFIRST update - D. Spergel (10+10)
 - 16:20 AOB
 - 16:30 Adjourn



Snowmass on the Mississippi a.k.a CSS 2013

Log in

Quick Links
All pre-Snowmass Meetings
Community Planning Meeting

Groups
Energy Frontier
Intensity Frontier
Cosmic Frontier
Frontier Capabilities
Instrumentation
Frontier
Computing Frontier
Education and Outreach

Google Search

snowmass2013.org
 WWW

Cosmic Frontier

Conveners: Jonathan Feng (UC Irvine), Steve Ritz (UC Santa Cruz)

ANNOUNCEMENTS

October 20, 2012: The [Cosmic Frontier Workshop](#) will be held March 6-8, 2013 at SLAC. SLAC Guest House rooms may be reserved now through the workshop website; registration will be open in December. The meeting will be joint with the Non-Accelerator Subgroup of Frontier Capabilities, and is being organized in coordination with meetings of DURA on March 5 and AARM on March 4.

October 13, 2012: Thanks to all who participated in the Cosmic Frontier sessions of the Community Planning Meeting. Talks given there are posted on the [CFM agenda page](#).

October 3, 2012: Drafts of all subgroup charges are posted. Comments to subgroup conveners welcome.

August 3, 2012: Subgroup Conveners are now posted. Many thanks to all who provided inputs and especially to all those who have agreed to serve as conveners.

June 20, 2012: We are currently soliciting community input for subgroup conveners, topics, and experiments (see below).

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. Topics include dark matter, dark energy, the matter-anti-matter asymmetry, cosmic particles, and astrophysical probes of fundamental physics.

ORGANIZATION

The work of the Cosmic Frontier is divided into 6 subgroups. They and their conveners are:

- CF1: **WIMP Dark Matter Direct Detection** (Priscilla Cushman, Cristian Galbiati, Dan McKinsey, Hamish Robertson, Tim Tait)
- CF2: **WIMP Dark Matter Indirect Detection** (Jim Buckley, Doug Cowen, Stefano Profumo)
- CF3: **Non-WIMP Dark Matter** (Alex Kusenko, Leslie Rosenberg)
- CF4: **Dark Matter Complementarity** (Dan Hooper, Manoj Kaplinghat, Konstantin Matchev)
- CF5: **Dark Energy and CMB** (Sarah Church, Scott Dodelson, Klaus Honscheid)
- CF6: **Cosmic Particle Probes of Fundamental Physics** (Jim Beatty, Ann Nelson, Angela Olinto)

The subgroups are led by expert experimentalists and theorists in each area. A "high-minded observer" may also be appointed to some subgroups. The linked subgroup webpages list relevant topics and experiments for each subgroup. In addition, many topics cut across more than one Frontier; overlaps requiring the collaboration of two or more working groups are also noted.

Several cross-cutting, ongoing discussions will be organized by the relevant subgroup conveners. For example, we anticipate having a regular **Dark Matter Forum** to connect people working in the subgroups.

Suggestions for additional topics and experiments that are currently missing from the subgroup descriptions are welcome. Please send comments and suggestions to the appropriate subgroup conveners. Please also feel free to use the Forum, which is linked below, so that others can follow the discussion.