

Electronic Newsletter 2013-2014, Part 2

March 11, 2014

In this issue

- [April 2014 Meeting, Savannah, Georgia](#)
- [Nominations for APS Fellowships](#)
- [DAP Business Meeting](#)
- [Mini-Symposium on Physics of the Cosmos](#)
- [Public Lecture and Plenary Session Highlights](#)
- [DAP Session Schedule](#)
- [Invited Session Highlights](#)

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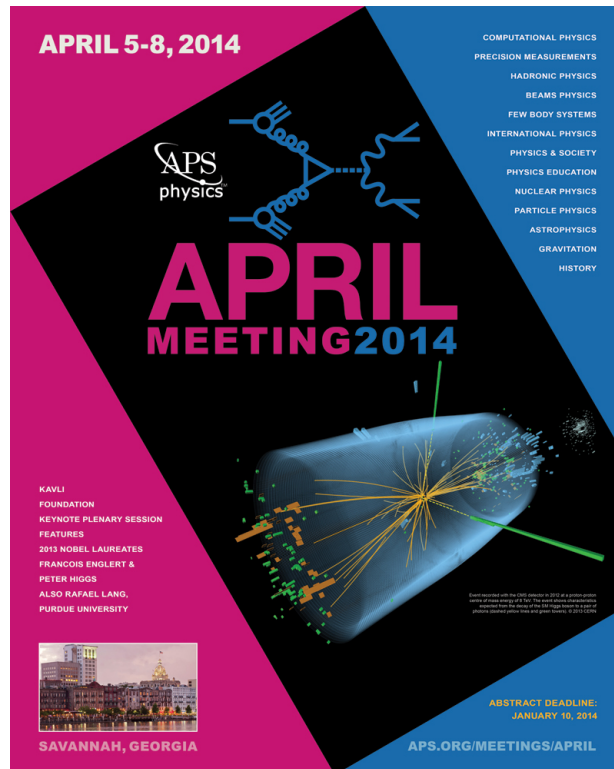
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Finalize your plans now to attend the April 2014 meeting held this year in Savannah, Georgia. A number of plenary and invited sessions will feature presentations by DAP members. Here are the key details:

What: April 2014 APS Meeting

When: Saturday, April 5 – Tuesday, April 8, 2014

Where: Savannah International Convention Center

HQ hotel: Hyatt Regency Savannah

Registration Deadline: Friday, March 14, 2014

The 2014 April Meeting meeting will take place at the Savannah international Convention Center. Detailed information for the meeting, including details on registration and the scientific program can be found online at <http://www.aps.org/meetings/april>

Note that for a regular APS member, on March 15, the registration fee goes up from \$465 to \$540.

Elections for the APS DAP Officers

Deadline: March 24, 2014

If you haven't done so as yet - **we urge you to cast your vote in the annual DAP elections for the DAP officers.** Please check your e-mailbox - the announcement and instructions arrived on February 24th.

Call for Nominations for APS Fellowship

Deadline: June 2, 2014

Members of the Division of Astrophysics are encouraged to submit nominations of DAP members for Fellowship in the APS, according to which, "Any active APS member is eligible for nomination and election to Fellowship. The criterion for election is exceptional contributions to the physics enterprise; e.g., outstanding physics research, important applications of physics, leadership in or service to physics, or significant contributions to physics education. Fellowship is a distinct honor signifying recognition by one's professional peers."

The number of new Fellows elected per year is limited to one-half percent of the current membership, and is apportioned according to Division membership. Last year, 12 nominations put forward by the DAP were successful.

As noted by the APS, "The membership of APS is diverse and global, and the Fellows of the APS should reflect that diversity. Fellowship nominations of women, members of underrepresented minority groups, and scientists from outside the United States are especially encouraged." The DAP strongly supports these statements.

Please consider nominating deserving DAP members for APS Fellowship! (Or persuading their department chairs and mentors to do so!) You can check a person's membership and fellowship status in the APS Member Directory <https://www.aps.org/membership/directory.cfm> . All instructions for nominations can be found at <http://www.aps.org/programs/honors/fellowships>

The DAP deadline for nominations is 2 June 2014. It takes some time to gather the materials and supporting letters, so we encourage you to start now.

Encourage your students to join the APS and DAP

Because of the importance of helping the next generation of physicists to grow their careers, the APS has many programs to help students. Students can join the APS with the first year free and the low rate of \$35/year thereafter; they can join up to two Divisions and Topical Groups for free. Please see <http://www.aps.org/membership/student.cfm> for details. Once they are members, students are eligible to give talks at APS meetings, apply for travel support and merit-based awards, and more. For example, student DAP members can apply for up to \$600 in travel support to attend the April Meeting; they can also be nominated to be recognized as a Young Star, which includes giving an invited talk plus additional financial support.

As you know, the APS works to "advance and diffuse the knowledge of physics." This includes advocacy with the government and the press, connecting different parts of the community, publishing leading journals, running meetings with great opportunities for students, providing professional recognition, and more.

In a similar way, the DAP works to advance and diffuse the knowledge of astrophysics, which includes helping the APS carry out the above missions. Astrophysics is on a great run of important discoveries that impact many fields. We are working to grow the scope of the DAP to better include new developments in cosmology, gravitation, particle and nuclear astrophysics, and more.

Advisors can play a crucial role in encouraging their students to join the APS and DAP. Please forward this to yours!

Overview of the April Meeting

Message from the DAP Chair-elect John Beacom

The April Meeting is big. Four days, sixteen APS units, hundreds of invited speakers, and thousands of participants. And also in the sense of new results and great talks across a wide variety of fields, a chance to meet and talk to many people, and opportunities for recruiting possible hires and impressing possible employers.

Organizing the DAP-related parts of this meeting involves the entire Executive Committee over several months. The effort is led by the Chair-Elect, who becomes Chair at the meeting. In addition, we are helped in organizing the contributed sessions by many volunteers at the Sorter's Meeting.

We are excited about this April Meeting and hope that you will be too. Here we note some highlights and special features of the DAP-related parts of the meeting. Details are given in the following pages.

- **Plenary events.** Several of the plenary talks will be of great interest to DAP members. In addition, there will be a public lecture by Stefan Gillessen on the gas cloud being eaten by the supermassive black hole in the center of the Milky Way and a public viewing of a movie ("Particle Fever") about the discovery of the Higgs Boson at the Large Hadron Collider.
- **Invited sessions.** The DAP, including through cooperation with several other APS units (DCOMP, DNP, DPF, GFB, and GGR), is offering a large number of sessions covering a wide range of forefront topics and a diverse set of excellent speakers. Our "Hot Topics" session highlights late-breaking results. In addition, there is a mini-symposium on the Physics of the Cosmos.
- **Business Meeting.** Please join us on Monday evening for the DAP Business Meeting, where food and drinks will be served.
- **Focus on Young Scientists.** For the Young Stars competition, the DAP Executive Committee selected Keith Bechtol and Nathan Whitehorn. Each will give an invited talk and will receive travel support. In addition, the DAP is providing partial travel support for many graduate students. As a pilot program to build international connections, this includes four students from Mexico; their talks are in the C9 and K9 contributed sessions.
- **Special Recognitions.** The Young Star talk by Bechtol will be in the S4: Gamma Rays session on Monday, and the Young Star talk by Whitehorn will be in the U4: Cosmic Rays session on Monday. The DAP-DNP Bethe Prize winner this year is Karl-Ludwig Kratz. His talk will be on Tuesday, in the Session Y3: R-Process Nucleosynthesis. The twelve DAP-nominated APS Fellows will be recognized at the DAP Business Meeting.

Annual DAP Business Meeting at April 2014 APS Meeting Monday, April 7 at 5:45 PM in room 203

The Division of Astrophysics will hold its annual **Business Meeting** at the April APS meeting in Savannah on **Monday, April 7 at 5:45 PM** in room 203. *All members of DAP are warmly encouraged to attend the annual business meeting.* Please join us for discussion of issues relevant to the membership of the DAP. Newly elected APS Fellows from the DAP will be honored. Refreshments will be served. See you there!

Mini-Symposium on the Physics of the Cosmos Sunday, April 6, 8:30 AM Session H8, Room 202

The Physics of the Cosmos program at NASA spans the fields of high-energy astrophysics, cosmology, and fundamental physics, and includes a wide range of science goals. A key activity is coordinating and soliciting input from the community on interesting science and technical directions within its science area. This session will open with an overview on High-Energy Astrophysics and Cosmology from Space by the Ann Hornschemeier, the PCOS Chief Scientist. This will be followed by a sequence of talks describing recent science highlights and future scientific opportunities in the areas of cosmic-ray studies, gamma-ray astrophysics, CMB measurements, Dark Energy, space-based gravitational wave detectors and X-ray astrophysics.

The speakers for the mini-symposium are below. For more information on PCOS and the PhysPAG please visit pcos.gsfc.nasa.gov/physpag.

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- **Ann Hornschemeier (PCOS Program Office Chief Scientist): “High Energy Astrophysics and Cosmology from Space”**
 - **Jay Bookbinder (XRSIG Chair): “Probing the Hot and Energetic Universe—X-rays and Astrophysics”**
 - **Shaul Hanany (IPSIG Chair): “CMB Measurements: Looking Forward from Planck2013”**
 - **Elizabeth Hays (GammaSIG Chair): “Exploring the Future Science of Space-based Gamma-ray Observations”**
 - **Guido Mueller (GWSIG Chair): “Space-based Gravitational Wave Observatories: Learning from the Past, Moving Towards the Future.”**
 - **Angela Olinto (CosmicSIG Chair): “CosmicSIG Science and Plans”**
 - **Jason Rhodes (PhysPAG EC Member): “NASA and Dark Energy”**

Plenary Session Highlights for April 2014 Meeting:

Plenary I (Session A1, Chatham A/B): Kavli Keynote Session: The Mysteries of Mass

Saturday, April 5, 8:30 AM

- Joe Incandela (CERN) *“The Discovery and Characterization of a Higgs Boson”*
 - Joseph D. Lykken (Fermilab) *“The Future of the Higgs Boson”*
 - Rafael Lang (Purdue) *“The Quest for Dark Matter”*
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Plenary II (Session Q1, Chatham A/B): Treasures From the Cosmic Frontier

Monday, April 7, 8:30 AM

- Naoko Kurahashi Neilson (U. Wisconsin, Madison) *“Cosmic Neutrinos in the IceCube Detector”*
 - Suzanne Staggs (Princeton) *“Probing the First Instants and the Rest of the Universe with Polarized Signatures in the Cosmic Microwave Background”*
 - Neil deGrasse Tyson (American Museum of Natural History) *“Tales from the Twitterverse”*
-

Plenary III (Session W1, Chatham A/B): One Hundred Years of the Beta-Decay Spectrum

Tuesday, April 7, 8:30 AM

- R.G. Hamish Robertson (Univ of Washington) *“Beta Decay: A Physics Garden of Earthly Delights”*
 - Wick Haxton (LBL & UC Berkeley) *“The Nuclear and Particle Physics of Neutrinoless Double Beta Decay”*
 - Sheldon Stone (Syracuse) *“Weak Decays as a Window to New Physics”*
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Public Lecture (Session G20, Hyatt Regency Savannah): Fireworks at the Galactic Center Black Hole?

Saturday, April 5, 7:30 PM

- Stefan Gillessen (Max Planck Institute for Extraterrestrial Physics)

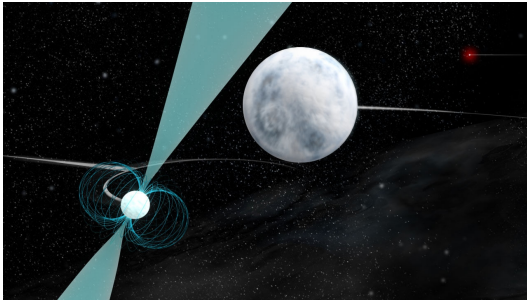
The center of the Milky Way hosts a gravity monster. A mass 4 million times larger than that of the Sun is concentrated there in a volume comparable to the solar system. A black hole is by far the most reasonable explanation for that. It is the closest supermassive black hole, and it is on a diet. The flow of material onto it is so small, that it shines just 200 times brighter than the Sun. But that might change in the near future. Just 2 years ago, astronomers at the Max-Planck-Institute for Extraterrestrial Physics have discovered a gas cloud of 3 Earth masses, that is heading almost directly at the black hole. Early 2014 the cloud will reach its point of closest approach. The tidal forces of the black hole will completely disrupt the cloud then — and the onset of the process has been observed with exquisite detail already. Some fraction of the material might then fall into the black hole — increasing its accretion rate and thereby also its luminosity. Astronomers all around the globe are quite keen on observing what will happen in the Galactic Center in the next few years.

DAP Sessions for April 2014 Meeting

The current schedule of plenary, invited, and contributed sessions sponsored or co-sponsored by DAP is tabulated in time-order below. On the following pages find the highlight descriptions of selected sections. This year's April meeting promises to be particularly exciting for members of the astrophysics and astroparticle physics and cosmology communities.

Session ID	Title	Day Date	Start Time	Room
A1	Plenary I: The Mysteries of Mass	Sat. Apr 5 2014	8:30AM	Chathan A/B
B4	Invited: Neutron Star Radii	Sat. Apr 5 2014	10:45AM	Chatham C
B9	Solar and Planetary Physics	Sat. Apr 5 2014	10:45AM	203
C4	Invited: Astrophysical and Cosmological Neutrinos	Sat. Apr 5 2014	1:30PM	Chatham C
C8	Neutron Stars and Pulsars	Sat. Apr 5 2014	1:30PM	202
C9	Galaxies and Clusters	Sat. Apr 5 2014	1:30PM	203
E2	Invited: Dark Matter - WIMPs	Sat. Apr 5 2014	3:30PM	Chatham A
E8	Black Holes in Astrophysics	Sat. Apr 5 2014	3:30PM	202
E9	Galactic Cosmic Rays	Sat. Apr 5 2014	3:30PM	203
G20	Public Lecture: Fireworks at the Galactic Center Black Hole	Sat. Apr 5 2014	7:30PM	Hyatt, TBD
H4	Invited: Early Universe	Sun. Apr 6 2014	8:30AM	Chatham C
H8	Mini-Symposium on Physics of the Cosmos	Sun. Apr 6 2014	8:30AM	202
H17	Invited: Impact of Advanced Digital Resources on Physics Research	Sun. Apr 6 2014	8:30AM	105 - 106
J2	Invited: Dark Matter - Beyond WIMPs	Sun. Apr 6 2014	10:45AM	Chatham A
J8	Ultra-high Energy Cosmic Rays	Sun. Apr 6 2014	10:45AM	202
K4	Invited: Jets and Astrophysical Tests of General Relativity	Sun. Apr 6 2014	1:30PM	Chatham C
K8	Astroparticle Observatories and Techniques	Sun. Apr 6 2014	1:30PM	202
K9	Indirect Dark Matter Searches	Sun. Apr 6 2014	1:30PM	203
M4	Invited: Hot Topics in Astrophysics	Sun. Apr 6 2014	3:30PM	Chatham C
Q1	Plenary II: Treasures From the Cosmic Frontier	Mon. Apr 7 2014	8:30AM	Chatham A/B
R4	Invited: Gravitational Lensing Applications of CMB Surveys	Mon. Apr 7 2014	10:45AM	Chatham C
R8	Gamma-ray and Neutrino Observations	Mon. Apr 7 2014	10:45AM	202
R11	Invited: Precision Big-Bang Nucleosynthesis	Mon. Apr 7 2014	10:45AM	Oglethorpe
S4	Invited: Cosmological Constraints from Gamma-Ray Data	Mon. Apr 7 2014	1:30PM	Chatham C
S8	Radio in Ice: UHECR Cosmic-rays and Neutrinos	Mon. Apr 7 2014	1:30PM	202
S9	Cosmic Microwave Background	Mon. Apr 7 2014	1:30PM	203
U4	Invited: Cosmic Rays	Mon. Apr 7 2014	3:30PM	Chatham C
U9	Cosmology	Mon. Apr 7 2014	3:30PM	203
U11	Invited: The Transient Gravitational Wave Sky	Mon. Apr 7 2014	3:30PM	Oglethorpe
X4	Invited: Results from the Dark Energy Survey	Tues. Apr 8 2014	10:45AM	Chatham C
X8	Supernovae and Gamma Ray Bursts	Tues. Apr 8 2014	10:45AM	202
X11	Invited: New Computational Techniques for Astrophysics	Tues. Apr 8 2014	10:45AM	Oglethorpe
Y3	Invited: R-Process Nucleosynthesis	Tues. Apr 8 2014	1:30PM	Chatham B
Y8	Supernovae and Gamma Ray Bursts II	Tues. Apr 8 2014	1:30PM	202
Y9	New Directions in Astrophysics	Tues. Apr 8 2014	1:30PM	203

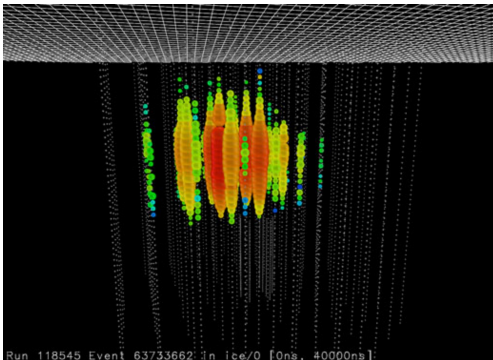
April 2014 Meeting DAP Invited Sessions Highlights: Part 1 of 5



Session B4: Neutron Star Radii

Saturday, April 5, 10:45 AM

In this session, we explore methods for precise and reliable measurements of neutron star radii and their implications for nuclear physics. In the first talk, Slavko Bogdanov will discuss measurements using X-ray pulse profiles from rapidly spinning neutron stars. In the second talk, Alexandros Gezerlis will describe work on obtaining the equation of state of cold dense matter using microscopic simulations. Finally, in the third talk Jocelyn Read will give an overview of the prospects for constraining the properties of neutron star core matter with gravitational wave observations in the near future.



Session C4: Astrophysical and Cosmological Neutrinos

Saturday, April 5, 1:30 PM

Neutrinos have recently been detected from distant astrophysical sources and through their effects on the cosmic microwave background. Do we understand their astrophysical sources and can we find more? Will cosmological observations detect neutrino mass or point to additional neutrino species? Markus Ahlers will present a theoretical and astrophysical interpretation of the IceCube events in the TeV-PeV range. Amy Connolly will detail the prospects for detecting neutrinos at still higher energies and revealing the origin of the ultra-high energy cosmic rays. Zhen Hou will provide theoretical interpretation for the hints of nonzero neutrino mass and extra flavors from cosmic microwave background observations.



Session U4: Cosmic Rays

Monday, April 7, 3:30 PM

Recent cosmic ray observations are challenging the interpretation of the cosmic rays spectrum. AMS has reached incredible precision on a range of particles from positrons to nuclei. Recent AMS results will be presented: those are challenging the interpretation of cosmic ray propagation models and testing alternative new physics hypothesis. IceCube neutrinos have started to probe an important range of cosmic ray energies and may give clues to anisotropies at ultra-high energies. Mysteries from the low to ultra-high energies will be addressed.

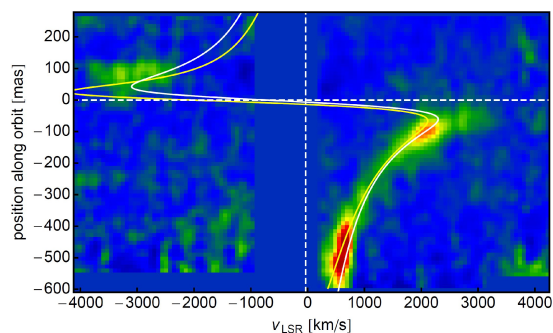


Computational Physics and Astrophysics:

- Session H17: The Impact of Advanced Digital Resources on Research in Physics (Sun. at 8:30 AM)
- Session X11: New Computational Techniques for Astrophysics (Tues. at 10:45 AM)

Over the past decade there has been an accelerating trend for the architectures that comprise the most advanced computational platforms to become increasingly heterogeneous, including GPUs and MICs, among other components. The challenges of using these new systems are formidable. These two sessions, sponsored jointly with DCOMP, will focus on developments in computing technology and applications to physics and astrophysics problems, with an emphasis on making it easier for others to use this new hardware.

April 2014 Meeting DAP Invited Sessions Highlights: Part 2 of 5



Session M4: Hot Topics in Astrophysics

Sunday, April 6, 3:30 PM

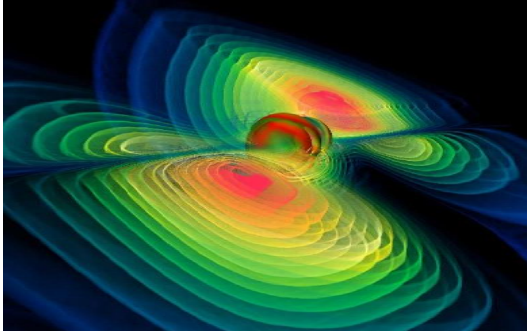
Planning for this session is delayed as long as possible to capture the latest, most exciting news in astrophysics as it breaks. Two of the three talks feature black holes. Galaxies like our own Milky Way are all believed to host supermassive black holes at their centers. Their unknown origin, a piece of the puzzle of galaxy formation, is thought to involve the growth into giants over time by the accretion of surrounding matter and the mergers of smaller black holes. The recent discovery of a dense, cold cloud (dubbed “G2”) plunging toward the SMB at our Galactic Center (Sgr A*) offers an unprecedented opportunity to see this process in action, to test models of black hole accretion and its associated feedback. Daryl Haggard will describe intensive multiwavelength campaigns (X-ray through radio) aimed at studying the radiation properties of Sgr A* as G2 breaks up and feeds the accretion flow. Measurement of black hole spin would also boost our understanding of black hole origin and growth, from stellar-mass to supermassive. The best current methods use X-ray spectroscopy to constrain the radius of the innermost stable circular orbit (ISCO). Dominic Walton will describe how X-ray observations by NuSTAR, coordinated with XMM, Swift and Suzaku, constrain the spin of black holes in AGNs and binary stars. At the highest observable photon energies, the TeV gamma rays mark the most extreme environments in the universe, from supernova explosions to active galactic nuclei to gamma-ray bursts, and are believed to correlate with the acceleration sites of charged cosmic rays. The High-Altitude Water Cherenkov (HAWC) TeV Gamma-Ray Observatory now under construction will observe large portions of the sky simultaneously, covering half the sky every 24 hours. Petra Huentemeyer will report how HAWC has already begun to measure large-scale structures and large- and small-scale anisotropies in the gamma-ray background, and possibly transient phenomena such as GRBs.

Session Y3: R-Process Nucleosynthesis

Tuesday, April 8, 1:30 PM

Where are the heavy elements beyond iron made? Although we know that this requires a neutron-rich environment, the viability of proposed sites like core-collapse supernovae and neutron-star mergers continues to be debated. Brian Metzger will describe electromagnetic observations of a candidate neutron-star merger event and will show the results of theoretical calculations of its element production. Hendrik Schatz will present an overview of laboratory nuclear measurements that shed light on how nuclei are formed in neutron-rich astrophysical environments such as accretion onto neutron stars. Karl-Ludwig Kratz, this year’s Bethe Prize awardee, will provide a comprehensive overview of what we know — and don’t know — about the r-process, based on all lines of evidence.

April 2014 Meeting DAP Invited Sessions Highlights: Part 3 of 5



Session U11: The Transient Gravitational Wave Sky

Monday, April 7, 3:30 PM

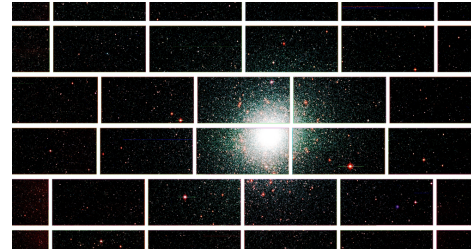
Gravitational-wave detectors may soon be recording signals from violent, transient events. It is expected that many such events will be accompanied by electromagnetic and particle signals. This session will survey the current understanding of gravitational-wave transients, the links with gamma-ray bursts, neutrino and other signals, and the potential for multimessenger astronomy with combined gravitational and electromagnetic and neutrino signals.



Session K4: Jets and Astrophysical Tests of General Relativity

Sunday, April 6, 1:30 PM

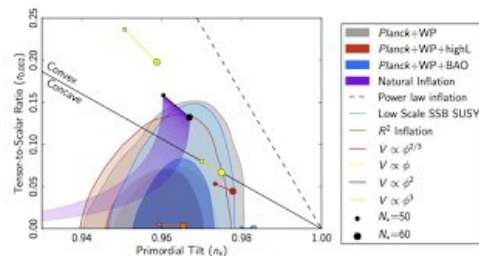
Black holes and neutron stars present us with many challenges because of their strongly relativistic gravitational fields. They challenge our understanding of basic physical mechanisms in their vicinity, they challenge our computational capabilities, and they challenge our belief in the validity of general relativity under such extreme conditions. This session features three talks that address each of these challenges, two addressing the observational and computational aspects - respectively by Sera Markoff and Sasha Tchekhovskoy - of jets from accreting compact sources, and one, by Scott Ransom addressing tests of GR using neutron star - white dwarf binaries, including the recently discovered pulsar with two white dwarf companions.



Session X4: Results from the Dark Energy Survey

Tuesday, April 8, 10:45 AM

The Dark Energy Survey has just completed its first of five seasons of data taking. When complete, the survey will probe the properties of the mysterious dark energy or find another explanation for the acceleration of the Universe. Three talks will highlight early science from DES. Marisa March will present results on detections of distant Type Ia supernovae, the apparent brightnesses of which pin down the redshift-distance relation. Eduardo Rozo will then discuss the discovery of galaxy clusters with DES and how these measurements complement cluster measurements at other wavelengths. Finally, Erin Sheldon will present early results and focus on systematic effects that need to be overcome to extract cosmological information from galaxy shapes.

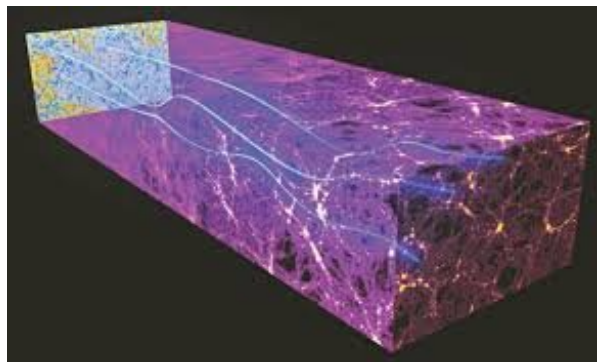


Session H4: Early Universe

Sunday, April 6, 8:30 AM

The Early Universe session will feature two talks about probing the physics of inflation with cosmic microwave background (CMB) observations, and one about the possibly critical role of neutrinos in baryogenesis. Daniel Green's talk, "Reaching the Planck Scale with CMB Polarization," will focus in particular on implications of searches for the B mode polarization signature of primordial gravitational waves. Marilena LoVerde's talk "Primordial non-Gaussianity and High Energy Physics," will review how measurements of non-Gaussianity can be used to discriminate between inflationary models and what the post-Planck era will bring. Mu-Chun Chen in "Leptogenesis" will discuss developments in a subject of recent interest, the use of neutrinos to explain the observed baryon asymmetry.

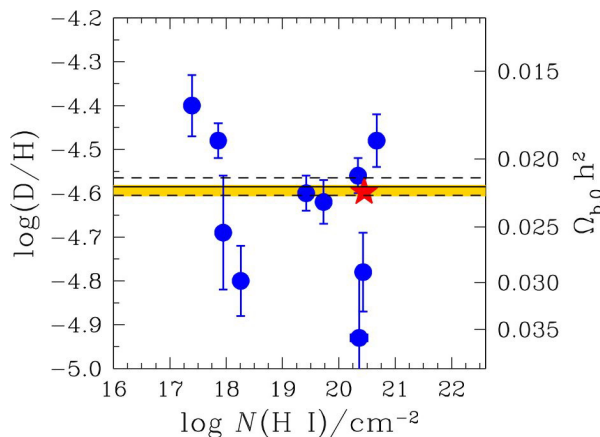
April 2014 Meeting DAP Invited Sessions Highlights: Part 4 of 5



Session R4: Gravitational Lensing Applications of CMB Surveys

Monday, April 7, 10:45AM

The last year saw the first (nearly) full-sky CMB lensing map, strong correlations of lensing maps with a number of other tracers of large-scale structure and the first detection of lensing-induced B modes in the polarization of the CMB. With the ongoing surveys, and ones planned for the near future, we have started the exploitation of lensing signals in CMB survey data. Gil Holder will address lensing B modes in the context of the hunt for the B modes created by inflationary gravitational waves, and also as a means of detecting the mass of the neutrinos in the cosmic neutrino background. Lindsey Bleem will reveal how cross correlations are giving vital clues about the relationship between, e.g., star formation and the underlying distribution of dark matter. Neal Dalal will explain the use of CMB surveys to develop a target list of high-magnification galaxies for high-resolution follow-up with ALMA, and how such follow-up observations have the potential to reveal signatures of warm dark matter.

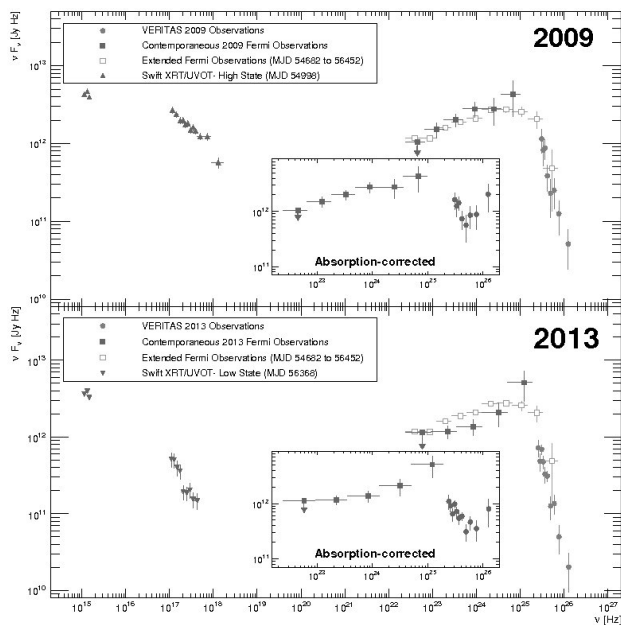


Session R11: Precision Big Bang Nucleosynthesis

Monday, April 7, 10:45AM

Does Big Bang Nucleosynthesis (BBN) have more to tell us beyond the creation story of the light elements? With precise new inputs, will everything fit together, or will new physics be required? Ryan Cooke will present new measurements of the primordial deuterium abundance and will explain how these limit the number of neutrino species. Brian Fields will synthesize several aspects of BBN to frame the discrepancy between the predicted and observed lithium abundance, as well as the classes of new physics that could explain it. Ulf-G. Meissner will explain how BBN and the triple-alpha process in stars constrain the ranges of fundamental parameters that can eventually lead to a universe with life.

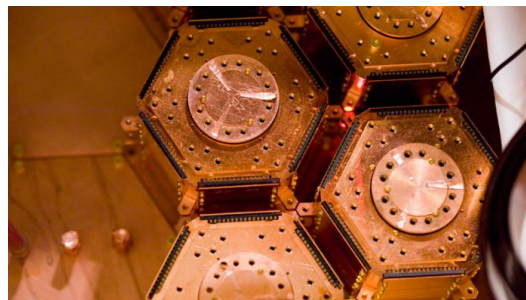
April 2014 Meeting DAP Invited Sessions Highlights: Part 5 of 5



Session S4: Cosmological Constraints from Gamma-ray Data

Monday, April 7, 1:30 PM

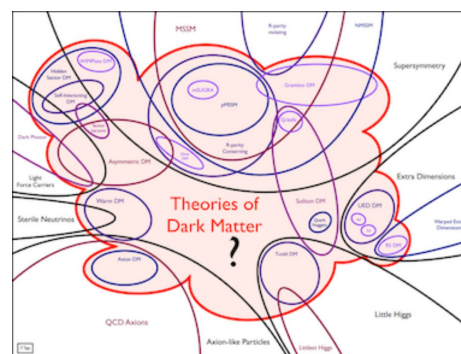
The Fermi Gamma-ray Space Telescope as well as ground-based Cerenkov telescopes are providing us with spectacular observations of celestial gamma-rays. Those observations allow detailed insight into the physical processes responsible for the most energetic radiation, but also provide important cosmological constraints. Keith Bechtol will summarize the results of studies of the extragalactic gamma-ray background, and will review the census of individual sources that contribute to its spectrum. Amy Furniss will highlight the insights into cosmology that can be obtained from high- and very-high energy gamma-ray spectra of distant active galaxies. Finally, Kohta Murase will discuss the cosmological constraints that can be gleaned from electromagnetic cascades, expected by propagation of gamma-rays from distant sources en route to the Earth.



Session E2: Dark Matter - WIMPS

Saturday, April 5, 3:30 PM

A wide variety of evidence points to the existence of non-baryonic dark matter. A major goal of the coming decade is to identify the physics behind dark matter. Panofsky Prize winner Blas Cabrera will describe the start of the art of direct detection experiments, set up underground to avoid backgrounds while observing the recoil of a nucleus due to a dark matter hit. Jan Conrad will then describe one of the most promising forms of indirect detection: searches for gamma rays produced when two dark matter particles annihilate in space. Carsten Rott will describe another: observations of neutrinos produced by dark matter annihilation.



Session J2: Dark Matter — Beyond WIMPs

Sunday, April 6, 1:45 PM

The most heavily studied dark matter candidate is the WIMP, but the dark matter may be something completely different. More general searches are needed and are underway. Tracy Slatyer will provide a theoretical perspective on what sorts of dark matter candidates are allowed in light of the many constraints from astrophysical observations, collider experiments, and underground searches. Shunsaku Horiuchi will discuss keV-mass sterile neutrinos as the dark matter, covering their possible advantages in terms of explaining observed aspects of structure formation as well as the recent claims of X-ray decay signals. Rouven Essig will describe more general models where the dark matter is but one particle in a much richer dark sector, and where new accelerator-based constraints may be especially revealing.