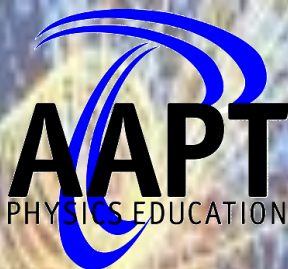


NJAAPT

**New Jersey
American Association
of Physics Teachers**



**Spring 2013
Section
Meeting**

**March 15-16, 2013
Princeton University**

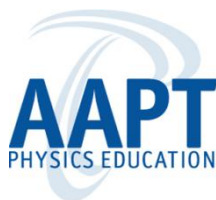
Welcome to the New Jersey AAPT Spring Section Meeting!

The title and focus of the 2013 section meeting is “Hot Topics in Physics”, with subjects ranging from the smallest particles to the vastness of the expanding universe.

Special thanks to Geoffrey Gettelfinger from Princeton University for his help and the use of Princeton facilities. Thanks also to the Executive Board for all of their planning efforts, and to Jessie Blair for coordinating the catering arrangements.

We especially thank our guest speakers, who have taken time out of their busy schedules to be here.

We hope that you will find the meeting informative and enjoyable, and we look forward to seeing you at future events.



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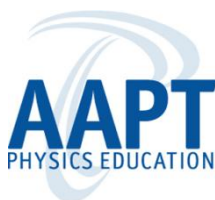
Dan Kaplan

Dave Maiullo

Yitzhak Sharon

Justin Son

Rich Urban



SCHEDULE of EVENTS

Friday March 15, 2013

Jadwin Hall

- 5:30 – 6:30 p.m. Registration,
Wine and Cheese Reception
- 6:30 – 7:30 p.m. Dinner -- Buffet style in the
Joseph Henry Room
- 7:30 – 9:00 p.m. **Andrew Zwicker**
PPPL
Princeton, NJ
*“Fusion 2013 – Just How Close Are
We to Creating a Star on Earth?”*

SCHEDULE of EVENTS

Saturday March 16, 2013

McDonnell Hall

- 8:00 – 9:15 a.m. Registration,
Coffee, Tea, Bagels
- 9:15 – 9:30 a.m. Introduction and Welcome:
Ray Polomski
President NJAAPT
- 9:30 – 11:00 a.m. **Saurabh Jha**
Rutgers University
“The Expanding Universe”
- 11:00–12:30 p.m. Idea Sharing Lunch
- 12:30-12:45 p.m. Award Presentation

- 12:45 – 2:15 p.m. **Nima Arkani-Hamed**
Institute of Advanced Study
*"The Inevitability of Physical Laws:
Why the Higgs Has To Exist"*
- 2:15 – 2:30 p.m. Break, Section Announcements
- 2:30 – 3:30 p.m. **Chris Tully**
Princeton University
"E & M Demo Show"

Andrew Zwicker

Princeton Plasma Physics Lab
Princeton, NJ

*“Fusion 2013—Just How Close Are We
to Creating a Star on Earth?”*



Andrew Zwicker is a physicist and science educator. The American Association of Physics Teachers has named him to its list of 75 leading contributors to physics education. For the past three years Zwicker has taken college undergraduates and K-12 teachers aboard the National Aeronautics and Space Administration’s “Weightless Wonder” aircraft. He is a Fellow of the American Physical Society, a member of the APS Committee on Education and a past chair of the APS Forum on Physics and Society. He is also a member of the Education and Workforce Development Task Force for the Department of Energy’s Energy Efficient Buildings, a lecturer in the Princeton

University Writing Program and a faculty advisor for freshmen and sophomores in the university's Rockefeller College. Zwicker and a collaborator won the 2006 Art of Science competition at Princeton University for a photograph entitled "Plasma Table." In 2012 Zwicker and a collaborator won an honorable mention for a video explaining a flame in a contest created by actor Alan Alda and the Center for Communicating Science at SUNY-Stony Brook. Andrew's interests include: Dusty Plasmas, Plasma Speakers, and the Use of Plasmas as Teaching Tools.

Fusion 2013—Just How Close Are We to Creating a Star on Earth?

The Princeton fusion energy program was started in 1951. More than 60 years later, researchers are collaborating on a variety of new experiments, including the first confined plasma that will produce more energy than it consumes. Is fusion a practical, economical, and reliable source for our future energy needs or will it remain simply a dream? In this talk, I will review the current status of the research and the near-term prospects for progress towards the first demonstration fusion power plant.

Saurabh W. Jha

Rutgers University

“The Accelerating Universe”



Saurabh W. Jha is an associate professor of Physics and Astronomy at Rutgers, the State University of New Jersey. Prof. Jha's research focuses on studying exploding white dwarf stars called Type Ia supernovae, and using them as cosmological tools with which to survey the Universe. A New Jersey native (graduating from East Brunswick High School), Prof. Jha received his Ph.D. in astronomy in 2002 from Harvard University, and subsequently was a Miller Research Fellow at UC Berkeley, as well as a Panofsky Fellow at the Stanford Linear Accelerator Center. In 2007 Prof. Jha was a co-recipient of the Gruber Cosmology Prize, as part of the High-z Supernova Search Team, for the joint discovery of the accelerating Universe.

The Accelerating Universe

In 1998 two rival teams of astronomers studying exploding white dwarf stars (called type Ia supernovae) came to the surprising conclusion that the expansion of the Universe is speeding up. This discovery of "the accelerating Universe" ushered in a revolution in our cosmological understanding, and was honored with the 2011 Nobel Prize in Physics. But what does it mean that our Universe is accelerating and how do we know? What does it imply for the future? I will describe how observations from telescopes on the ground and in space are used to answer these questions and shed light on the mysterious "dark energy" that dominates and drives our accelerating Universe.

Nima Arkani-Hamed

Institute of Advanced Studies,
Princeton

*“The Inevitability of Physical Laws:
Why the Higgs Has To Exist”*



Nima Arkani-Hamed earned his Ph.D. in Physics from the University of California-Berkeley. He was an assistant professor at the University of California, a professor at Harvard University, and is currently a faculty member of the Institute of Advanced Studies in Princeton, NJ. He is the recipient of a Phi Beta Kappa teaching award from Harvard (2005), the Gribov Medal of the European Physical Society (2003), and a number of fellowships, including a Packard Fellowship and a Sloan Fellowship, and the Raymond and Beverly Sackler Prize in Physics (2008). In July 2012, Nima was an inaugural awardee of the Fundamental Physics Prize, the most lucrative academic prize in the world.

One of the leading particle physics phenomenologists of his generation, Nima Arkani-Hamed is concerned with the relation between theory and experiment. His research has shown how the extreme weakness of gravity, relative to other forces of nature, might be explained by the existence of extra dimensions of space, and how the structure of comparatively low-energy physics is constrained within the context of string theory. He has taken a lead in proposing new physical theories that can be tested at the Large Hadron Collider at CERN in Switzerland.

**“The Inevitability of Physical Laws:
Why the Higgs Has To Exist”**

Nima will be discussing his recent work with the Higgs Boson and any new pertinent progress related to it.

Christopher Tully

Princeton University

“Electricity & Magnetism Demo Show”



Christopher Tully earned his Ph.D in Physics (1998) from Princeton University, and his B.S from Caltech. He has been a professor of physics at Princeton University for 13 years. He was a CERN Fellow, 1998-2000, and a recipient of a Sloan Fellowship in 2003 and the IBM Einstein Fellowship at the IAS in 2010.

One of the world's leading experimental particle physicists, Chris Tully has played prominent roles at several frontier high energy physics facilities: the LEP electron-positron collider at CERN, the D0 experiment at the Fermilab Tevatron Collider and the CMS experiment at the CERN Large Hadron Collider. He is author of the textbook “Elementary Particle Physics in a Nutshell” (2010) published by the Princeton University Press, and of

a chapter on 4pi detectors in an upcoming text “100 years of subatomic physics” to be published by World Scientific in 2013.

Currently, his research at the LHC includes Higgs boson physics and searches for Supersymmetry, collider-produced Dark Matter, and extended symmetries between leptons and quarks. He has also designed a new experiment called PTOLEMY (Princeton Tritium Observatory for Light, Early-Universe, Massive-Neutrino Yield) at the Princeton Plasma Physics Laboratory to challenge one of the most fundamental predictions of the Big Bang – the present-day existence of relic neutrinos produced less than one second after the Big Bang. Princeton University physicists have taken a leading role in the understanding and experimental verification of the thermal history of the universe dating back to the landmark paper in 1965 by Dicke, Peebles, Roll, and Wilkinson.

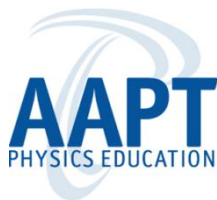
E & M Demo Show

Chris will be presenting various demonstrations related to Electricity and Magnetism.

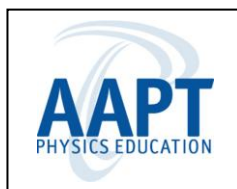
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