

DMP NEWSLETTER

Division of Material Physics

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A Message from the Chair

This Newsletter outlines many of the DMP sessions and activities at the upcoming March Meeting, the recipients of the Adler Award and McGroddy Prize, the new APS Fellows who were nominated through the DMP, the DMP student travel award winners, and the newly elected members of the DMP Executive Committee.

Now is the time to propose new Focus Topics for the 2013 March Meeting by contacting David Cahill, who will be the DMP Program Chair for the 2013 March Meeting. The DMP focus topics provide an opportunity to gather related talks in distinct and well-defined sessions, and they also provide the opportunity to mix invited and contributed talks in the same sessions. Your colleagues will appreciate and benefit from your suggestions, so please see the detailed instructions below and put together some ideas. After the new focus topics are announced later this year, please consider suggesting invited speakers to the organizers, so that the sessions will include the best possible invited program.

This is also a time to nominate distinguished members of our community for the David Adler Lectureship Award in the Field of Materials Physics, and the James C. McGroddy Prize for New Materials. Both of these awards bring high visibility and recognition to the recipients, so please consider who among your colleagues might be deserving and then put together a nomination packet. See <http://www.aps.org/programs/honors/> for details of the nomination processes.

As will be immediately evident from the March Meeting program, materials physics is an exciting and growing field. The DMP membership contributes enormously to every aspect of the field, and the DMP Executive Committee members are very pleased that we can play a role.

We all look forward to seeing you in Boston,

Peter Schiffer, Chair
Division of Materials Physics

New members of the Executive Committee

The following members were elected to serve in the DMP Executive Committee

Vice Chair: Laura Greene
Member at Large: Mark Hybertsen
Member at Large: Susanne Stemmer

We congratulate the new members of the Executive Committee and look forward to their participation and leadership.

Call for DMP Focus Session Topics for 2013 APS March Meeting

The Division of Materials Physics organizes a large number of Focus Topics for each APS March Meeting. A Focus Topic generally consists of a series of sessions, each of which is typically seeded with one invited talk, the remainder of the session being composed of contributed talks (see <http://www.aps.org/units/dmp/newsletters/summer2011.cfm#list> for a list of Focus Topics for the 2012 March Meeting). While many Focus Topics are continued from year to year, some are removed and some new topics are added in fields of current interest.

We are now soliciting new ideas for Focus Topics for the 2013 March Meeting, and we hope you will send suggestions. Your suggestions should provide the following information:

- Title of the Focus Topic
- The nominator's name, affiliation, phone number and e-mail address
- Suggestions for possible organizers
- A brief description of the scope of the topic.

Please send your suggestions by February 25 to David Cahill (d-cahill@illinois.edu), who will be the DMP Program Chair for the 2013 meeting. Suggestions received after February 25 will be reviewed by the DMP Executive Committee if time allows.

March Meeting: Location

The 2012 March Meeting of the APS will take place, February 27- March 2, 2012 in the Boston Convention Center Boston, MA. All scientific sessions will be in the Boston Convention Center (BCEC) but events and activities may be in BCEC or the Westin Boston Waterfront Hotel. Check event details for time and place. Bussing will be provided to the convention center from all hotels not within walking distance.

For further information see:

<http://www.aps.org/meetings/march/index.cfm>

March Meeting: DMP Sponsored Meetings

The Division of Materials Physics will sponsor the following meetings during the 2012 March meeting in Boston. This is your opportunity to interact with the Executive Committee and to become informed of the activities of the Division.

The Westin Boston Waterfront Hotel, 425 Summer Street • Boston, MA 02210 • USA •
Phone: (617) 532-4600 • Fax: (617) 532-4630

Tuesday, February 28
DMP Co-sponsored Reception (with DCMP/DCOMP/DCP) for Prize/Award Winners,
New Fellows, and Tribute to Peter Adams (of PRB)
5:30 p.m. - 7:00 p.m.
Westin Boston Waterfront Hotel Grand Ballroom AB

DMP Business Meeting
7:00 p.m. - 8:00 p.m.
Westin Boston Waterfront Hotel Revere

The American Physical Society-Division of Materials Physics Iris Ovshinsky Student Travel Awards

The Iris Ovshinsky Student Travel Awards have been established to assist the career of student researchers. The Awards are named after Iris Ovshinsky who had a very strong interest and commitment to scientific education. The awards have been endowed by the Ovshinsky family, their colleagues at Energy Conversion Devices (ECD) companies and all their numerous friends from many social, intellectual and business relationships.

The Iris Ovshinsky Student Travel Awards will be presented at the DCMP/DMP New Fellows and Award Winners Reception, Tuesday, February 28, 5:30 p.m. in the Westin Grand Ballroom AB.

We are extremely grateful to the Ovshinsky family for this award. Special thanks go to Prof. Brian Schwartz who has made this award possible and for all his efforts on behalf of Materials Physics over the years.

The winners of the 2012 Iris Ovshinsky Student Travel Awards for Materials Physics are:

| NAME | INSTITUTION |
|---------------|-------------------------------------|
| L. Adamska | University of South Florida |
| E. Haroz | Rice University |
| X. He | University of California, Riverside |
| H. Hodovanets | Iowa State University |
| B. Li | The Ohio State University |
| J. Liu | University of Arkansas |
| K. McCreary | University of California, Riverside |
| D. Zhang | The Pennsylvania State University |

Award and Prize Winners

James C. McGroddy Prize for New Materials

Robert J. Cava, Princeton University

"For pioneering discovery of new strongly correlated materials, especially novel superconductors."

David Adler Lectureship Award

Stuart Parkin, IBM Almaden Research Center

"For inspiring experimental research, lectures, and writing in the area of metallic spintronics."

2011 Fellows nominated by DMP:

Bennett, Brian

Naval Research Laboratory

Citation: For pioneering contributions to the epitaxial growth, characterization, and design of narrow band-gap semiconductor heterostructures.

Christen, Hans

Oak Ridge National Laboratory

Citation: For pioneering studies of effects of strain, confinement, and interfaces on the properties of complex oxide films enabled by novel pulsed-laser deposition and characterization methods.

Driscoll, Judith

University of Cambridge

Citation: For pioneering contributions in design and understanding of nanostructured functional oxides, including superconductors, magnetic materials, ferroelectrics, multiferroics and semiconductors.

Ferrari, Andrea Carlo

University of Cambridge

Citation: For pioneering contributions to the understanding of phonons and electron-phonon interactions in carbon based materials, particularly for establishing Raman spectroscopy as a standard characterisation tool.

Fiebig, Manfred

Univ of Bonn

Citation: For developments in non-linear optics and their application to solving seminal problems in multiferroics.

Gu, Genda

Brookhaven National Laboratory

Citation: For outstanding contributions to the synthesis of high quality single crystals for experimental research, particularly the high T_c superconducting cuprates.

Hwang, Harold

Stanford University

Citation: For fundamental contributions to the materials physics of correlated electron materials through the prudent use of doping, artificial interfaces, dimensional confinement, and electronic reconstruction.

Jaime, Marcelo

Los Alamos National Laboratory

Citation: For pioneering techniques for the study of thermal properties of materials in high pulsed magnetic fields and for contributions to the understanding of colossal magnetoresistance compounds, Kondo insulators, correlated-electron systems, and quantum magnets.

Johnson, Alan

University of Pennsylvania

Citation: For creative and influential discoveries furthering our understanding of the electronic and vibrational properties of single-walled carbon nanotubes.

Muller, David

Cornell University

Citation: For pioneering contributions to the development of electron energy loss spectroscopy as a quantitative tool and its application to unraveling connections between changes in electronic-structure and macroscopic behavior.

Noheda, Beatriz

Univ of Groningen

Citation: For fundamental structural studies of new phases in perovskite-type ferroelectric materials and of domain nanostructures in epitaxial films of multiferroics.

Robertson, John

University of Cambridge

Citation: For outstanding achievements in theoretical understanding of electronic materials including high dielectric constant oxides, diamond-like carbon, carbon nanotubes, and amorphous silicon.

Ruoff, Rodney

Northwestern University

Citation: For comprehensive contributions to the science and physics of fullerenes, nanotubes, and graphene, including novel methods of synthesis, detailed characterization, and measurement of physical properties.

Saito, Susumu

Tokyo Institute of Technology

Citation: For major contributions to the theoretical understanding of low-dimensional systems and nano-structures.

Suzuki, Yuri

University of California, Berkeley

Citation: For innovative work in epitaxial oxide thin films, nanostructures and devices, with tailored magnetic and electronic properties, and the development of platforms for photonic structures.

Yan, Yanfa

National Renewable Energy Laboratory

Citation: For contributions to the understanding of defect physics and structure and electronic property relationship of energy materials, quasicrystals, and wide band gap metal oxides, through electron microscopy and first-principles electronic structure calculations.

Zhu, Yuntian

North Carolina State University

Citation: For pioneer work on the fundamental understanding of deformation physics in nanocrystalline materials.

March Meeting: DMP Sponsored Symposia & Special Events

I. Session D19: Novel Phases in Strongly Correlated Iridates

Sponsoring Units: DCMP DMP

Room: 253AB; Monday, February 27, 2012 2:30PM - 4:54PM

2:30PM

D19.00001 Spin orbit coupling, electron correlations and exotic magnetism in 5d complex Ir oxides

Invited Speaker: HIDENORI TAKAGI

3:06PM

D19.00002 Topological and spin-liquid phases in strongly correlated iridates

Invited Speaker: YONG BAEK KIM

3:42PM

D19.00003 Possible proximity of the Iridates $(\text{Na,Li})_2\text{IrO}_3$ to a topologically ordered Mott insulator: Phase diagram of the Heisenberg-Kitaev model

Invited Speaker: SIMON TREBST

4:18PM

D19.00004 Honeycomb lattice spin-orbit Mott insulators

Invited Speaker: PHILIPP GEGENWART

II. Session D27: Invited Session: Materials for Energy Applications

Sponsoring Units: DMP GERA

Room: 258AB; Monday, February 27, 2012 2:30PM - 5:30PM

2:30PM

D27.00001 The DOE SunShot Initiative: Science and Technology to enable Solar Electricity at Grid Parity

Invited Speaker: RAMAMOORTHY RAMESH,

3:06PM

D27.00002 Integrating the multifunction necessary for electrochemical energy storage into energy- and size-scalable ultraporous nanoarchitectures

Invited Speaker: DEBRA ROLISON

3:42PM

D27.00003 Bio-inspired Approaches to Solar Energy Conversion

Invited Speaker: MICHAEL WASIELEWSKI,

4:18PM

D27.00004 Quantum-well and quantum-dot structures for high-efficiency photovoltaics

Invited Speaker: EDWARD YU

4:54PM

D27.00005 Combined conversion of heat and light with Photon Enhanced Thermionic Emission for solar energy harvesting

Invited Speaker: NICHOLAS MELOSH

III. Session H27 McGroddy Prize, Adler Lectureship, and Pake

Sponsoring Unites: GMAG DMP FIAP

Prize: Superconductivity and Spin Transport

Room: 258AB; Tuesday, February 28, 2012 8:00AM - 11:00AM

8:00AM

H27.00001 Assembling, understanding, auguring phase diagrams for Fe-based superconductivity

Invited Speaker: PAUL CANFIELD

8:36AM

H27.00002 **James C. McGroddy Prize for New Materials Lecture:** New Superconductors and other Research in New Materials

Invited Speaker: ROBERT CAVA

9:12AM

H27.00003 **David Adler Lectureship Award in the Field of Materials Physics:** Racetrack Memory - a high-performance, storage class memory using magnetic domain-walls manipulated by current

Invited Speaker: STUART PARKIN

9:48AM

H27.00004 **George E. Pake Prize Lecture:** Pulsed Laser Deposition and the Oxide Electronics Revolution

Invited Speaker: T. VENKATESAN

10:24AM

H27.00005 A New Avenue towards Colossal Magnetoresistance in Organic Tunneling Junctions

Invited Speaker: JIAN SHEN

IV. Session T10: Earth-Abundant Materials for Critical Technologies

Sponsoring Unit: DMP

Room: 210A; Wednesday, February 29, 2012 2:30PM - 5:30PM

2:30PM

T10.00001 An Overview of Rare Earth Science and Technology

Invited Speaker: KARL GSCHEIDNER, JR.

3:06PM

T10.00002 Replacing critical rare earth materials in high energy density magnets

Invited Speaker: R. WILLIAM MCCALLUM

3:42PM

T10.00003 Solar to Fuel Conversion with Earth Abundant Materials

Invited Speaker: DANIEL G. NOCERA

4:18PM

T10.00004 Organic-inorganic hybrid materials for energy efficiency

Invited Speaker: SETH COE-SULLIVAN

4:54PM

T10.00005 Photovoltaic devices using inexpensive, abundant inorganic materials: experiences with copper zinc tin sulfide (CZTS)

Invited Speaker: SUPRATIK GUHA,

V. Session X19: Two Dimensional Electron Systems at Oxide Interfaces

Sponsoring Units: DMP DCMF

Room: 253AB; Thursday, March 1, 2012 2:30PM - 5:30PM

2:30PM

X19.00001 Electronic structure of the interfacial LaAlO₃/SrTiO₃ 2D electron gas

Invited Speaker: JEAN-MARC TRISCONE

3:06PM

X19.00002 Fundamental Properties of the 2-D Electron Liquid Generated by LaAlO₃-SrTiO₃ Interfaces

Invited Speaker: JOCHEN MANNHART

3:42PM

X19.00003 Gate control of the mobility, carrier density and superconductivity at the LaAlO₃/SrTiO₃ interface

Invited Speaker: CHRISTOPHER BELL

4:18PM

X19.00004 Electronic and structural correlations at 2DEG oxide heterointerfaces1

Invited Speaker: M.S. RZCHOWSKI

4:54PM

X19.00005 Electronic structure and two-dimensional electron gas at the surface of SrTiO₃

Invited Speaker: ANDRES FELIPE SANTANDER-SYRO,

VI: Session X27: Physics for Everyone: Innovative Materials for Energy

Sponsoring Units: DMP DCMF

Room: 258AB; Thursday, March 1, 2012 2:30PM - 5:30PM

2:30PM

X27.00001 Materials research needs for energy

Invited Speaker: ARUN MAJUMDAR

3:06PM

X27.00002 Water Splitting with Materials and Sunlight

Invited Speaker: TOM JARVI

3:42PM

X27.00003 Advanced materials manufacturing for solar energy

Invited Speaker: FRANK VAN MIERLO

4:18PM

X27.00004 Genetically Engineered Materials for Biofuels Production

Invited Speaker: MICHAEL RAAB

4:54PM

X27.00005 Innovative oxide materials for electrochemical energy conversion

Invited Speaker: ERIC D. WACHSMAN

March Meeting: APS Special Symposia & Events

BCEC = Boston Convention & Exhibition Center

Westin = Westin Boston Waterfront Hotel

APS Prizes & Awards Ceremonial Session

Monday, February 27

5:45 p.m. - 6:45 p.m.

BCEC Room 253AB

- Prizes and awards will be bestowed on several individuals for outstanding contributions to physics. Please plan on attending the Awards Program and join us in honoring these individuals. The names of the awards and awardees will be included in the printed Preamble distributed at the Meeting.
- The Welcome Reception will begin immediately following the Awards Program.

Session G1: Kitchen as a Lab

Physics Community Outreach

Monday, February 27

8:00 p.m. - 9:30 p.m.

Convention Center Room: 253AB

Speakers: Ferran Adria, World-Famous Chef Jose Andres, World-Famous Chef Michael P. Brenner, Harvard University

Session N1: Watson's Life After Jeopardy!

Public Lecture

Tuesday, February 28

8:00 p.m. - 9:30 p.m.

Convention Center: Room 253 ABC

Speakers: David McQueeney, IBM Research, Neil Gershenfeld, Massachusetts Institute of Technology

Session P12: Tutorial for Authors and Referees

Wednesday, February 29

8:00 a.m. - 9:30 a.m.

BCEC 253B

Session T19: Kavli Foundation Special Session: Emergent Physics at the Mesoscale

Wednesday, February 29

2:30 p.m. – 5:30 p.m.

BCEC Ballroom East

Chair: Kate Kirby, Executive Officer, American Physical Society

Session U20: Town Hall on Mesoscopic Materials and Chemistry

Wednesday, February 29

5:45 p.m.

BCEC Room 253C

Session U60: "Trends" in the APS Publication Physics

Wednesday, February 29

7:30 p.m.

Westin Grand Ballroom A

Spin Caloritronics: Spin-Dependent Thermoelectrics and Beyond
Gerrit E.W. Bauer, IMR, Tohoku University; Kavli Institute, TU Delft
7:30 p.m.- 8:00 p.m.

Animalcules Redux: The Fantastic World of Microswimmers
Raymond Goldstein, University of Cambridge
8:00 p.m. - 8:30 p.m.

Metamaterials, Transformation Optics, and the Science of Invisibility
John Pendry, Imperial College London
8:30 p.m.- 9:00 p.m.

Session X60: Nobel Prize Discussion

Thursday, March 1

5:45 p.m. BCEC 210B

Speaker: Michael S. Turner APS President-Elect, University of Chicago

March Meeting: Premeeting Workshops

Workshops held Saturday or Sunday, February 25 and 26

DPOLY Short Course

Saturday, February 25 - 1:00 p.m. Sunday, February 26 - 8:00 a.m.

Westin Otis

Professional Skills Development Workshop

Sunday, February 26 - 8:00 a.m. - Westin Stone Room

Careers In Physics Workshop

Sunday, February 26 - 4:00 p.m. BCEC Room 159

Estate Planning Workshop

Monday, February 27 - 1:00 p.m. BCEC 151B

March Meeting: Tutorials

Sunday, February 26

Boston Convention & Exhibition Center (BCEC)

Tutorial Program Chair

Mark Johnson Naval Research Laboratory Washington, DC

Morning Tutorials

Convention Center

8:30 a.m. - 12:30 p.m.

Tutorial # 1

Density Functional Theory

BCEC 156A

Tutorial #2

Pnictides Superconductivity

BCEC 156B

Tutorial #3

Topological Insulators

BCEC 157B

Tutorial #4

XSEDE: An Advanced and Integrated Set of Digital Resources for Science and Engineering

BCEC 158

Afternoon Tutorials

Convention Center

1:30 p.m. - 5:30 p.m.

Tutorial #5

Spintronics

BCEC 156A

Tutorial #6

Graphene

BCEC 156B

Tutorial #7

Physics of Cancer

BCEC 157A

Tutorial #8

Complex Oxides

BCEC 157B

Tutorial #9

Many-Body Systems of Ultracold Atoms

BCEC 157C

March Meeting: Tutorial for Authors and Referees

Sponsored by APS Journals

Tutorial for Authors and Referees

BCEC = Boston Convention & Exhibition Center

Westin = Westin Boston Waterfront Hotel

APS Journals Booth

Monday - Wednesday, February 27-29, 10:00 a.m. BCEC Exhibit Hall C

Meet the Editors of AIP and APS Reception

Tuesday, February 28 - 4:00 p.m. - 6:00 p.m. BCEC Outside Room 205

Tutorial for Authors and Referees (Session P12)

Wednesday, February 29 - 8:00 a.m. BCEC 253B

"Trends" in the APS Publication Physics (Session U60)

Wednesday, February 29 - 7:30 p.m. Westin Grand Ballroom A

DMP Executive Committee

The Executive Committee Officers for the 2011-2012 year, who begin their terms immediately following the March meeting in Boston, are:

Chair: Peter Schiffer (03/11 – 03/12)
Penn State University

Chair-Elect: D.G. Schlom (03/11-03/12)
Cornell University

Vice Chair: David Cahill (03/11-03/12)
Univ. of Illinois Urbana Champaign

*Vice Chair: Laura Greene (03/12-03/13)
Univ. of Illinois Urbana Champaign

Past Chair: Robert Nemanich (03/11 – 03/12)
Arizona State University

Secretary/Treasurer: Chris Palmstrøm (03/11-03/14)
University of California, Santa Barbara

Councilor: Theodore L Einstein (01/09 - 12/12)
University of Maryland-College Park

Members-at-Large:

David J. Sellmyer (03/09 – 03/12)
University of Nebraska

Nicola Spaldin (03/09 – 03/12)
ETH Zurich

Amanda Petford-Long (03/10 – 03/13)
Argonne National Laboratory

Philip Duxbury (03/10 – 03/13)
Michigan State University

Bruce Harmon (03/11 - 03/14)
Ames Laboratory

Charles Ahn (03/11 - 03/14)
Yale University

*Mark Hybertsen (03/12 - 03/15)
Brookhaven National Laboratory

*Susanne Stemmer (03/12 - 03/15)
University of California, Santa Barbara

*Newly elected