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PHYSICS  
NEWSLETTER  
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## AY11-12 Academic Degrees and Student Awards

### B. S. Degrees - Fall 2011

Michael Schwager –  
with Honors (>3.5 GPA)  
Caleb Stoltzfus – with Honors

### B.S. Degrees - Spring 2012

Mark Gockenbach -  
with Highest Honors (>3.7 GPA)  
Jared Newman - with Honors  
Courtney Peck – with Highest Honors  
Colin Reutter  
Russell Ricker – with Honors

**AJM Johnson Outstanding Senior Award: Courtney Peck**  
**Outstanding Seniors: Jared Newman and Russell Ricker**

### M. S. Degrees - Spring 2012

Ernest Amouzou  
Neilya Beisenkhanova (thesis with Prof. Sachiko Tsuruta)  
Orion Bellorado  
Michael Freed  
Jared Rice  
Benjamin Rosemeyer  
Mark Stalnaker  
Geoffrey Wicks

### Ph. D. Degrees - Summer 2011

Hongyan Li (with Prof. Yves Idzerda)

### Ph. D. Degrees - Spring 2012

Adam McClure (with Prof. Yves Idzerda)  
Steven Price (with Prof. Bennett Link)  
Jason Scott (with Research Prof. Piet Martens)

**2012 Outstanding GTA Award: Orion Bellorado and Shine Roshan**  
**Runners up – Jeremy Hostetter, Arlo Johnson, Jared Rice**



## Additional Department Awards for 2012

### **2012 Outstanding Staff Member Award: Bo Glaspey**

Thank you, Bo, for keeping the equipment in our labs running well.

### **2012 Outstanding Technical Staff Award: Larry Springer**

Thank you, Larry, for your many contributions to a very successful SSEL program.

### **2012 Outstanding Faculty Colleague Award: Charles Kankelborg**

Thank you, Charles, for your smile and ever helpful, positive attitude.

### **2012 OGLI Award – Outstanding Graduate Level Instructor: Dana Longcope**

### **2012 UGLI Award – Undergraduate Level Instructor Award: Charles Kankelborg**

## GENERAL NEWS



**Professor Yongchen Sun** spent the academic year in the Physics Department on sabbatical leave from the Department of Earth Sciences & Physics at the University of South Dakota in Vermillion. During his stay he was carrying out laser spectroscopy experiments with Charles Thiel and Rufus Cone on optical coherence properties of rare earth crystals and ceramics for applications to quantum information and to spectral hole burning device applications pursued by MSU Spectrum Lab and S2 Corporation of Bozeman. A number of research papers have been submitted and published.

*Spectroscopic investigations of  $\text{Eu}^{3+}:\text{Y}_2\text{SiO}_5$  for quantum memory applications*, B. Lauritzen, N. Timoney, N. Gisin, M. Afzelius, H. de Riedmatten, Y. Sun, R. M. Macfarlane, and R. L. Cone, Phys. Rev. B **85**, 115111 (2012) [10 pages]; <http://dx.doi.org/10.1103/PhysRevB.85.115111>

**Editors' Suggestion:** *Optical Decoherence and Energy Level Structure of  $0.1\%\text{Tm}^{3+}:\text{LiNbO}_3$* , Y. Sun, C. W. Thiel, and R. L. Cone, Phys. Rev. B **85**, 165106 (2012) [13 pages]; <http://dx.doi.org/10.1103/PhysRevB.85.165106>

*Rare-earth-doped materials with application to optical signal processing, quantum information science, and medical imaging technology*, R. L. Cone, C. W. Thiel, Y. Sun, Thomas Böttger, and R. M. Macfarlane, Proc. SPIE 8272, 82720E (2012); <http://dx.doi.org/10.1117/12.909154>

*Rare-earth-doped  $\text{LiNbO}_3$  and  $\text{KTiOPO}_4$  (KTP) for waveguide quantum memories*, C. W. Thiel, Y. Sun, R. M. Macfarlane, Thomas Böttger, and R. L. Cone, J. Phys. B: At. Mol. Opt. Phys., **45**, 124013 (2012).

**The first National Student Solar Spectrograph Competition** was held at MSU, hosted by MSGC, on May 16-19. The competition is part of the education effort for NASA's IRIS mission. Teams from MSU, Harding University, Flathead Valley Community College, San Diego State University, Montgomery College, and Montana Tech designed and built spectrographs using the Sun as a light source. Students from each of the winning teams received a \$3000 scholarship and funding to travel to the IRIS launch.

Winning teams: Best Science Observation Award - Montgomery College in Rockville, Md.  
Best Presentation of Results Award - San Diego State University.  
Best Spectrograph Design Award - Team "Darkstar" from MSU.  
Best Spectrograph Build Award - "The Greek Team" from MSU.

Judges for the competition included MSU's Charles Kankelborg, Larry Springer, and Joe Shaw. The 2013 competition will be held again at MSU May 15-18, 2013. Registration is now open at [spacegrant.montana.edu/iris](http://spacegrant.montana.edu/iris). A news release with more information and photos can be found at <http://www.montana.edu/cpa/news/nwview.php?article=11283>



## AWARDS, HONORS, AND NEW POSITIONS



At graduation ceremonies across the state of Montana students supported by MSGC donned NASA graduation sashes. Shown at left are Courtney and Alyssa Peck from MSU.

Charles Kankelborg was invited to join the NASA Sounding Rocket Working Group, which meets twice a year at NASA Headquarters.

Prof. Yves Idzerda has been elected to be the Vice Chair of the American Physical Society Topical Group on Magnetism and its Applications (GMAG) and will be the Chair-Elect in 2013.



Yves Idzerda, Advanced Light Source user from Montana State University, and a member of the ALS Users' Executive Committee and the Proposal Study Panel, was recently elected vice-chair of the National User Facility Organization (NUFO) Steering Committee; he will become chair in 2013. NUFO represents the interests of over 48,000 Users across the nation who conduct research at 76 different U.S. national scientific user facilities. The primary mission is to facilitate communication among users, user organizations, facility administrators, and other stakeholders to provide a unified message at the national level on issues of resources for science, economic competitiveness, and education for the next-generation scientific work force.

## **CONFERENCE ORGANIZATION**

Rufus Cone is on the International Advisory and Program Committee, for the Conference on Holeburning, Single Molecule, and Related Spectroscopies: Science and Applications 2009, Palm Cove, Australia, June 21 - 25, 2009.

## **PUBLICATIONS**

"Exploring the Interface Between the Sun's Surface and Corona", Charles Kankelborg, Physics Today, April 2012.

"Temperature-dependent structures of proton-conducting  $\text{Ba}(\text{Zr}_{0.8-x}\text{Ce}_x\text{Y}_{0.2})\text{O}_{2.9}$  ceramics by Raman scattering and x-ray diffraction" by C.-S. Tu, R.R. Chien, V.H. Schmidt, S.C. Lee, and C.-C. Huang, J. Phys.: Condens. Matter **24**, 155403 (6 pp.) 2012.

Robert Blinc obituary, by Zvonko Trontelj, Hugo Schmidt, and David C. Ailion, Physics Today **65**, p. 70, April 2012. Robert was a leading ferroelectrics and liquid crystal expert, and visited MSU several times

"Spectroscopic investigations of  $\text{Eu}^{3+}:\text{Y}_2\text{SiO}_5$  for quantum memory applications", B. Lauritzen, N. Timoney, N. Gisin, M. Afzelius, H. de Riedmatten, Y. Sun, R. M. Macfarlane, and R. L. Cone, Phys. Rev. B **85**, 115111 (2012) [10 pages]; <http://dx.doi.org/10.1103/PhysRevB.85.115111>

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"Optical decoherence studies of yttrium oxyorthosilicate ( $\text{Y}_2\text{SiO}_5$ ) co-doped with  $\text{Er}^{3+}$  and  $\text{Eu}^{3+}$  for optical signal processing and quantum information applications at 1.5 microns", C. W. Thiel, W. R. Babbitt, R. L. and Cone, Phys. Rev. B **85**, 174302 (2012) [15 pages]; <http://dx.doi.org/10.1103/PhysRevB.85.174302>

"Rare-earth-doped materials with application to optical signal processing, quantum information science, and medical imaging technology", R. L. Cone, C. W. Thiel, Y. Sun, Thomas Böttger, and R. M. Macfarlane, Proc. SPIE 8272, 82720E (2012); <http://dx.doi.org/10.1117/12.909154>

"Rare-earth-doped  $\text{LiNbO}_3$  and  $\text{KTiOPO}_4$  (KTP) for waveguide quantum memories", C. W. Thiel, Y. Sun, R. M. Macfarlane, Thomas Böttger, and R. L. Cone, J. Phys. B: At. Mol. Opt. Phys. **45**, 124013 (2012).

## **PROPOSALS SUBMITTED**

“Simultaneous Imaging and Spectroscopy of the Solar Transition Zone”, Charles Kankelborg PI, NASA LCAS program, \$2.5M

## **PROPOSALS FUNDED**

“High Resolution Thermal Expansion Measurements of Ice”, NSF, June 1, 2012 to May 31, 2015, \$210,000, John J. Neumeier.

## **INVITED TALKS**

Nico Yunes gave a plenary talk at the Sackler Lecture organized by the Center for Astrophysics at Harvard University. He also gave a plenary talk at the International LISA Symposium, Paris, France.

Nico Yunes gave a colloquium at the Department of Applied Mathematics and Theoretical Physics of Cambridge University. He also participated in the ADS/CFT Workshop at the Perimeter Institute.

“Rare-Earth-Doped Materials with Application to Optical Signal Processing, Quantum Information Science and Medical Imaging Technology”, Rufus L. Cone, Charles W. Thiel, Yongchen Sun, Thomas Böttger, and Roger M. Macfarlane, San Francisco, CA, January 21 - 26 2012

“Rare-Earth Doped Materials for Quantum Information, Optical Signal Processing, Laser Frequency Stabilization, Ultra-sharp Filters, and Medical Imaging Technology, R. L. Cone, C. W. Thiel, Yongchen Sun, Thomas Böttger, and R. M. Macfarlane, Holeburning, Single Molecule, and Related Spectroscopies: Science and Applications, University of Tübingen, Germany, August 27-31, 2012.

## **CONTRIBUTED TALKS**

“Fuel cell and electrolysis mode results for BCY SOFC compared with model predictions” V.H. Schmidt and C.-L. Tsai, 221<sup>st</sup> Electrochemical Society Meeting, Seattle, WA, May 6-10, 2012.

“A Surprising Discovery in the Group 5 Transition Metals”, John J. Neumeier, Walther Meissner Institut, Garching, Germany, 14 May 2012.

“Measuring the Thermal Expansion of Solids using a Cell Constructed of Fused Quartz”, John J. Neumeier, Department of Physics, University of Frankfurt, Frankfurt Germany, 10 May 2012 and Institute of Physics II, University of Cologne, Cologne, Germany, 18 May 2012.

“Overview of an Important Quasi-1D Solid: The Lithium Purple Bronze  $\text{Li}_{0.9}\text{Mo}_6\text{O}_{17}$ ”, John J. Neumeier, Department of Physics, University of Frankfurt, Frankfurt Germany, 10 May 2012 and Institute of Physics II, University of Cologne, Cologne, Germany, 18 May 2012.

"Filament and Sigmoid Statistics Gathered by Newly Developed Automated Feature Finding Modules", Piet Martens, Rafal Angryk, Juan Banda, Karthik Ganesan Pillai, Michael Schuh, NSO Workshop #26: Solar Origins of Space Weather and Space Climate: Connecting the Interior to the Corona, Sacramento Peak, April 30 - May 4, 2012.

### **TRAVEL**

John Neumeier visited the Deutsches Elektronen Synchrotron in Hamburg, Germany, May 6-9, 2012, to conduct x-ray diffraction experiments on single-crystalline niobium.

### **PUBLIC OUTREACH**

On May 9th, nine 8th graders and two teachers from Lewistown, MT, traveled to Bozeman to make holograms with Paul Rugheimer, tour Prof. Idzerda's Magnetism Lab and enjoy the magnetism demos. All 11 participants made successful white-light reflection holograms of various articles they brought. The group was led by their science teacher, Suzie Flentie, who has participated in the RET program in Prof. Idzerda's lab in prior years.