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GENERAL NEWS



Students, faculty and staff enjoy a bonfire at the annual departmental retreat.

Approximately 75 students, faculty, staff and their family members attended the department's annual retreat in September at the Lion's Club Youth Camp in the Hyalite Canyon.



**PHYSICS
NEWSLETTER**

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Aleks Rebane, Mikhail Drobizhev and Charles Spangler filed a provisional patent "Asymmetrical naphthalocyanines for two-photon volumetric optical storage," in collaboration with Ciba Specialty Chemicals of Basel, Switzerland.

PH.D. ORAL

"Photonic Crystals", Laura Lediaev, September 26.

"Got Mass? An introduction to Neutrino Oscillations", Mehmet Unver, September 29.

"Mini-Magnetospheric Plasma Propulsion: Setting Sail on the Solar Wind", Trae Winter, September 30.

PUBLICATIONS SUBMITTED

"CDS Coronal Loops: Multithermal Analysis", by Schmelz and P. Martens, ApJL.

"Dielectric and photo-voltaic phenomena in tungsten doped $Pb(Mg_{1/3}Nb_{2/3})_{1-x}Ti_xO_3$ crystal," Chi-Shun Tu, F.-T. Wang, R. R. Chien, V. H. Schmidt, T.-M. Hung, and C.-T. Tseng, Applied Physics Letters.

"Electric-induced dielectric anomalies and optical birefringence in $Pb(Zn_{1/3}Nb_{2/3})_{1-x}Ti_xO_3$," Chi-Shun Tu, F.-T. Wang, R. R. Chien, V. H. Schmidt, and L. C. Lim, Physical Review B.

PUBLICATIONS

"Slow light with persistent hole burning," R. N. Shakhmuratov, A. Rebane, P. Megret, and J. Odeurs, Phys. Rev. A 71, 053811 (2005).

"Quantum interference in organic solid", A. Rebane, N. Christensson, M. Drobizhev, Y. Stepanenko, C.W. Spangler, Optics Express 13 (16), 6033-6038 (2005).

"Effects of nonzero neutrino masses on black hole evaporation", Daniel Bambeck and William A. Hiscock, Classical and Quantum Gravity Vol. 22, p. 4247 (2005).

"Prior poling effect on thermal phase stability in (110)-cut $Pb(Mg_{1/3}Nb_{2/3})_{0.74}Ti_{0.26}O_3$ single crystal," R. Chien, V. H. Schmidt, C.-S. Tu, and F.-T. Wang, submitted to Journal Applied Physics.

"Electric-field poling effect on thermal stability of monoclinic phase in $Pb(Mg_{1/3}Nb_{2/3})_{0.74}Ti_{0.26}O_3$ single crystal," R. R. Chien, V. Hugo Schmidt, and Chi-Shun Tu, accepted for publication in Journal of Crystal Growth (Proc. of the 16th American Conference on Crystal Growth and Epitaxy, 2005).

PROPOSALS SUBMITTED

"REU Site: Solar Physics Program at Montana State University". \$680K, five year REU renewal proposal to NSF for 12 summer students/year. PI Martens, Co-I's Canfield and McKenzie.

PROPOSALS FUNDED

"Improved oxidation resistance for steel SOFC interconnects; Cr volatility of coated SOFC interconnects; Cr poisoning at YSZ electrolyte surfaces; growth and characterization of dense YSZ on porous Ni-YSZ" DOE, MSU-HITEC, \$358.562, Dick Smith, Year 4.

INVITED TALKS

"Multi-photon quantum interference in organic solid," Aleks Rebane, 14th Annual Laser Physics Workshop, July 4 -8, 2005, Kyoto, Japan.

"Quantum interference in organic solid," Aleks Rebane at CLEO/QELS Pacific Rim, July 11 -15, 2005, Tokyo, Japan

"Two-photon porphyrin core dendrimers for optical power limiting," Aleks Rebane, AFOSR Polymer Chemistry and Polymer Matrix Composites Program Review 8-12 August 2005, San Diego, CA.

CONTRIBUTED TALKS

"Synthesis and characterization of Ni-Ba(Ce_{1-x}Y_x)O₃ cermets for hydrogen separation membranes", Jiaping Han, K. Lakshminarayanan, S. Friesen, V. H. Schmidt, G. W. Coffey, L. R. Pederson, and P. C. Rieke, Materials Science & Technologies Meeting 2005: Symposium of Materials for the Hydrogen Economy, Pittsburgh, PA, USA, accepted for oral presentation, September 26-28,.

"Coherent domain structure in linear and dendrimer chromophores studied by one- and three-photon absorption spectroscopy" , M. Drobizhev, N. Christensson, A. Rebane, Z. Suo, C. W. Spangler, O. Mongin, M. Blanchard-Desce, SPIE Annual Meeting July 31-August 6, 2005, San Diego, CA.

"Quantum interference by femtosecond multi-photon absorption in conjugated dendrimers," Aleksander Rebane, Niklas Christensson, Mikhail Drobizhev, Yuriy Stepanenko, Charles W. Spangler, SPIE Annual Meeting July 31-August 6, 2005, San Diego, CA.

"Optimization of femtosecond two-photon storage by spectral pulse shaping,," N. Makarov, M. Drobizhev, A. Rebane, SPIE Annual Meeting, July 31-August 6, 2005, San Diego, CA.

"Temperature dependent phase transitions in PZN-7%PT single crystal," V. Hugo Schmidt, R. R. Chien, Chi-Shun Tu, and F.-T. Wang, 11th International Meeting on Ferroelectricity, Argentina / Brazil, September 5-9, 2005.

"Actuators Based on PVDF Sheets with Flexible PEDOT Polymer Electrodes," V. Hugo Schmidt, Joseph Polasik, Laura Lediae, and Jil Hallenberg, 12th International Symposium on Electrets, Salvador, Bahia-Brazil, September 11-14, 2005.

"White Light Interferometry", Sytil Murphy, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

"Quantum interference by femtosecond multi-photon absorption", Aleks Rebane, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

"Energies of 4f^N and 4f^{N-1}5d States Relative to Host Bands in Rare-earth-doped Fluorides", Charles Thiel, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

"Coherent domain structure in nonlinear-optical chromophores studied by multi-photon absorption spectroscopy", Mikhail Drobizhev, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

"Photonic Chirp Compression and Microwave Arbitrary Waveform Generation", Christoffer Renner, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Quantum computing in rare-earth doped crystals”, Mingzhen Tian, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Amplification and processing of weak optical signal in Tm:YAG”, Ijaz Safarullah, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Active mode-locked external cavity diode laser: characteristics & frequency stabilization”, Yihan Xiong, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Quantum computing in rare-earth doped crystals”, Mingzhen Tian, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

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“Active mode-locked external cavity diode laser: characteristics & frequency stabilization”, Yihan Xiong, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

POSTER PRESENTATIONS

“Range-doppler imaging using an analog optical signal processor with agile waveform Sets”,
^a Randy R. Reibel,^a Daryn E. Benson,^a Trenton Berg,^a Zachary Cole,^a Kristian D. Merkel,^a and W. Randall Babbitt^b ^a Scientific Materials Corporation, ^b Spectrum Lab, Montana State University, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Synthesis, characterization and preclinical studies of targeted photo-dynamic therapy agents activated in the tissue transparency window”, Jean Roasind Starkey, Fangming Meng, Aijun Gong, Britney L. Moss, Aleksandre Rebane, Mikhail Drobizhev, and Charles W. Spangler, MSU and MPA Technologies, Bozeman, MT, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Optimization of fast rewritable two-photon optical storage in near-resonant conditions, Nikolay Makarov, Physics Dept., MSU-Bozeman, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Characterizing the optical scattering signature of honey bees”, Jesse Way,^a Dustin D. Dunkle,^a Joseph A. Shaw,^a Kevin S. Repasky,^a John L. Carlsten,^b Lee H. Spangler,^c and Laura Dobeck.^c ^a Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT ^b Physics Dept., Montana State University, Bozeman, MT ^c Chemistry and Biochemistry Dept., Montana State University, Bozeman, MT, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Detection of honey bees using wing-beat modulation of continuous-wave laser light”, Ryan H. Scheppele,^a Chris Melton,^b Amin Nehrir,^a Kevin S. Repasky,^a Joseph A. Shaw,^a John L. Carlsten,^a Lee H. Spangler^c ^a Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT ^b Physics Dept., Montana State University, Bozeman, MT ^c Chemistry and Biochemistry Dept., Montana State University, Bozeman, MT, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

“Progress toward a water vapor differential absorption lidar (DIAL) using a widely tunable amplified diode laser source”, Michael D. Obland,^a Kevin S. Repasky,^b Joseph A. Shaw,^b John L. Carlsten,^a Lei S. Meng^a ^a Physics Dept., Montana State University, Bozeman, MT, ^b Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT, 2005 OPTEC Conference, Bozeman, MT, September 22-23.

COLLOQUIA

“Neutrino Pulsars”, Bennett Link, Department of Physics, Montana State University, September 9.

“Did a Gamma-Ray Burst Initiate the Late Ordovician Extinction?”, Adrian L. Melott, Department of Physics and Astronomy, University of Kansas, September 16.

“Thallium atoms, diode lasers, and 'table-top' tests of fundamental symmetries”, Protik K. Majumder, Department Chair and Associate Professor of Physics, Williams College, September 23.

"In search of the ‘absolute’ optical phase", Dr. Pete Roos, Research Scientist, Spectrum Lab, September 30.

SEMINARS

Condensed Matter

“A Two-Fluid Model for Granular Superconductivity”, Dr. Carlos dos Santos, Superconductivity Group – Department of Materials Science, FAENQUIL / São Paulo State Government, Lorena, Brazil (Carlos is a visiting scholar at MSU from 8/05 to 8/06), September 15.

“X-ray Photoemission Investigation of Colossal Magnetoresistance Systems”, Kurash Ibrahim, Synchrotron Radiation Laboratory, Beijing, China, September 22.

“Magnetic Resonance Microscopy (MRM) studies of Structure and Transport in Porous Media”, Prof. Sarah Codd, Dept. of Mechanical and Industrial Engineering, September 29.

Space Science and Engineering Lab

“Designing Systems for the Space Shuttle & International Space Station and Other Launch Vehicles: A Personal Perspective”, Perry G. Ballard, Chief Engineer, Johnson Space Center, September 15.

TRAVEL

Bennett Link traveled to Waseda University in Tokyo, Japan, to attend the 21st COW Symposium on Astrophysics as an interdisciplinary science, August 30-September 6.

Mike Obland traveled to Goddard Space Flight Center September 20th-23rd to attend the GSRP Symposium and to do collaborative work with Dr. Jonathan Rall, September 20-23.

Jason Scott attended the GSPR Symposium held in Greenbelt, MD, September 23-23.

Ezana Negusse conducted a series of experiments at the NSLS Brookhaven National Lab. (BNL) in Upton, NY, September 20-October 11.

Ron Hellings attended a LISA ESA/NASA Retreat held in Trento, Italy, September 24-28.

Angela DesJardins, Goddard Space Flight Center in Greenbelt, MD, conduct research, September 24-October 1.

Bill Hiscock attended the EPSCoR Coalition Retreat at Rio Mar, Puerto Rico, September 29-30.