

Good News from the Department of Physics and Astronomy

- **Doerte Blume** and graduate student **Kevin Daily** co-authored a paper: D. Blume and K. M. Daily, Trapped two-component Fermi gases with up to six particles: Energetics, structural properties, and molecular condensate fraction, *C. R. Physique* 12, 86 (2011)

Doerte also published a review article: D. Blume: Few-body physics with ultracold atomic and molecular systems in traps, invited review article; accepted for publication in *Reports on Progress in Physics*.

Finally, Doerte served as a co-organizer of a National Science Foundation (NSF)-funded workshop titled “AMO Theory: Recent Developments and a Vision for the Future.” The workshop was held at the NSF from August 18-19, 2011. The other co-organizers were Klaus Bartschat, Carlton Caves, and Ivan Deutsch.

- **Sukanta Bose** chaired the session on “Classical General Relativity and Gravitational Waves” at the International Conference on Gravitation and Cosmology, which celebrated its Silver Jubilee in Goa, India, in December 2011. At the conference, he was also invited to a roundtable discussion titled “What astrophysics, cosmology and fundamental physics can we learn from a global network of gravitational-wave detectors?” In addition, he gave a set of lectures at both the School on Cosmology and Gravitational Waves and the Workshop on Gravitational Wave Astronomy in Pune, India, in December.

Earlier, in November, Sukanta gave an invited talk at the meeting of the European Gravitational Observatory (EGO) and the Indian Initiative in Gravitational-wave Observations (IndIGO) in Pune, India.

Sukanta also gave a plenary talk in July 2011 at the 9th Edoardo Amaldi Conference on Gravitational Waves—held at Cardiff University in Cardiff, Wales—on his work with **Dipongkar Talukder** on Multi-baseline Gravitational Wave Radiometry.

At the Numerical Relativity and Data Analysis meeting in Cardiff, Wales, in July, graduate student **Thilina Dayanga** presented his work on “A coherent multi-baseline gravitational-wave search in Numerical Injection Analysis-2 data” with Sukanta Bose.

Graduate student **Shaon Ghosh** presented his work on “Searching for short-duration gamma-ray bursts with large sky-position errors in LIGO” at December 2011’s International Conference on Gravitation and Cosmology in Goa, India.

Graduate student **Szymon Steplewski**, who is now working on the commissioning of the Advanced Laser Interferometer Gravitational-wave Observatory in Hanford, Washington, was awarded a NASA Space Grant in fall 2011.

- **Sue Dexheimer** was awarded a \$375,000 renewal of her grant “Dynamics of Localized Photoexcitations in Condensed Matter Systems” from the NSF Condensed Matter Physics Program.

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Sue presented two recent invited talks, one at the Telluride Conference on Solar Solutions to Energy and Environmental Problems (August 2011) and the other at the Advanced Light Source Workshop on Time-Resolved X-Ray Science (October 2011).

- **Tom Dickinson** received a Samuel H. and Patricia W. Smith Teaching and Learning Grant from WSU's University College in the amount of \$5000. The citation reads: "Expansion and improvement of questioning and tutoring tools for instruction and assessment in physics incorporating wolfram Mathematica." In conjunction with Tom's grant, we are pleased to announce a new undergraduate topics course, PHYS 481. The first topic is Mathematica.
- **Matthew Duez** received an NSF grant: Numerical Simulations of Compact Neutron Star Binary Mergers (Award: \$150,000 for three years).
- **Yi Gu** has been organizing a Focus Topic Session, "Electron, Ion, and Exciton Transport in Nanostructures," for the 2012 American Physical Society (APS) March Meeting, to be held in Boston, Massachusetts.

Yi is scheduled to give an invited talk at the 2012 Materials Research Society (MRS) Spring Meeting, as well as invited talks at both the Annual Symposium on Applied Surface Analysis and the Annual Symposium of the Pacific Northwest Chapter of the American Vacuum Society (AVS).

- **Kudos to Mark Kuzyk**, who is now a Fellow of the American Physical Society. His citation reads: "For outstanding contributions to the development of an understanding of the origins of the nonlinear optical response and applying this understanding to the development of novel nonlinear optical materials." Mark is also a fellow of the International Society of Optics and Photonics (SPIE) and the Optical Society of America (OSA). For a list of all our "fellows" and other faculty awards, please visit: <http://www.physics.wsu.edu/Spotlight/index.html>
- **Phil Marston** has been appointed an OSA senior member. According to the OSA website, "OSA members are well-established individuals with a designation that recognizes their experience and professional accomplishments or service within their field that sets them apart from their peers. Senior Members have at least 10 years of significant professional experience and are active OSA Individual Members." Please see more information here: http://www.osa.org/membership/member_categories/senior/2011_OSA_Senior_Members.aspx

An article by Phil and graduate student **Likun Zhang** was referenced in the American Association for the Advancement of Sciences (AAAS) *Science Now* article "Not Pulling Your Leg: Tractor Beams May Be Possible." Read all about it here:

<http://news.sciencemag.org/sciencenow/2011/11/not-pulling-your-leg-tractor-bea.html>

More information on the referenced article:

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Likun Zhang and P. L. Marston, "Geometrical interpretation of negative radiation forces of acoustical Bessel beams on spheres," *Physical Review E* 84, 035601(R) (2011)
<http://link.aps.org/doi/10.1103/PhysRevE.84.035601>

- **Matt McCluskey** and graduate student **Samuel Teklemichael** were featured in the Nanotechweb.org newswire for their research, titled "Unified model solves two problems in ZnO." It discusses investigating acceptor and surface states in ZnO to give a framework for designing energy-efficient lighting. You can read the article here: <http://nanotechweb.org/cws/article/lab/47772>
- **Farida Selim, Matt McCluskey**, graduate student **Marianne Tarun**, and collaborators published a paper on November 16, 2011—"Cu doping of ZnO by nuclear transmutation" in *Applied Physics Letters* 99, 202109 (2011)—in which they doped an oxide semiconductor by the nuclear transmutation method for the first time. The referee anticipates that the paper will be of great interest to both the oxide and semiconductor communities.

Farida, graduate student **Chris Varney**, and collaborators have published the first two papers from their new laboratory this December. In one paper they discovered a new luminescence in an important photonic material that has been hidden from researchers for 40 years. The paper was published on December 8, 2011, in *AIP Advances* 1, 042170 (2011), the new open access journal of the American Institute of Physics, and is scheduled to press-released to the public in *AIP Press*.

The second paper, "On the optical properties of undoped and RE doped YAG single crystals," was published on December 12, 2011, in *Journal of Physics D* 45, 015103 (2012). Farida, Chris, et al. have also submitted two other papers to the *Journal of Applied Physics* and *Physical Review Letters*.

- **Chuanwei Zhang** was the recipient of a three-year NSF grant (\$150,000; period: 08/16/2011-08/16/2014). He was also awarded a three-year grant from the Air Force Office of Scientific Research (AFOSR) (\$480,000; PI: Vito Scarola, Virginia Tech; Co-PI: Chuanwei Zhang, WSU part: \$232,375, period: 09/16/2011-09/16/2014), as well as given a one-year extension for his DARPA-MTO (Defense Advanced Research Projects Agency – Microsystems Technology Office) grant (total: \$160,000, PI: Sumanta Tewari (Clemson University), Co-PI: Chuanwei Zhang, WSU part: \$80,000, period: 09/16/2011-09/15/2012). Congratulations, Chuanwei!

Chuanwei, his group members, and his graduate students have also been actively publishing their work:

His graduate student **Yinyin Qian** has published a paper in *Physical Review A*, along with postdoc **Ming Gong**: Yinyin Qian, Ming Gong, and Chuanwei Zhang, Quantum Transport of Bosonic Cold Atoms in Double Well Optical Lattices, *Phys. Rev. A* 84, 013608 (2011). Additionally, Chuanwei and his group members (**Ming Gong, Yongping**

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Zhang, and Li Mao) had a paper published and another accepted for publication in *Physical Review Letters*:

Ming Gong, Sumanta Tewari, and Chuanwei Zhang, BCS-BEC Crossover and Topological Phase Transition in 3D Spin-Orbit Coupled Degenerate Fermi Gases, *Phys. Rev. Lett.* 107, 195303 (2011) (*Published*)

Yongping Zhang, Li Mao, and Chuanwei Zhang, Mean-field Dynamics of Spin-orbit Coupled Bose-Einstein Condensates, *Phys. Rev. Lett.* in press (2011).

- Congratulations to graduate student **Likun Zhang**, who was selected to receive a Graduate School Doctoral Scholarship of \$1,000. This scholarship is awarded to individuals in the Ph.D. program who have shown outstanding research and scholarship among their contemporaries at WSU.

Alumni

Aubrey España (Ph.D. 2009), http://acousticalsociety.org/about_acoustics/webcast. The webcast has been archived and can be viewed at <http://www.aipwebcasting.com>. The panelists included Aubrey España of University of Washington's Applied Physics Laboratory, who discussed "the detection of unexploded ordnance with acoustics."

Recent Graduates: Ph.D.

Summer 2011

Regina Barber DeGraaff – Advisor: John Blakeslee
Brandon Lalone – Advisor: Yogendra Gupta

Fall 2011

Enamul Khan – Advisor: J. Thomas Dickinson
Santosh Swain – Advisor: Kelvin Lynn

Recent Graduates: M.S.

Summer 2011

Drew Haven - Advisor: Kelvin Lynn

Fall 2011

Nikolay Frik – Advisor: Guy Worthey
Violet Poole – Advisor: Guy Worthey
Shores Shafei – Advisor: Mark Kuzyk
Xiangyu (Desmond) Yin – Advisor: Mark Kuzyk

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Pearl Harbor Day – The Bands’ Journey Through China Remembered

Friday, December 7, 2011, marked the 70th anniversary of the bombing of Pearl Harbor. The Japanese attack brought the United States of America into World War II. As a direct result of that event, one of our former faculty members, Dr. **William Band** (professor of physics, 1949-1971, and physics department chair, 1962-1966), and his wife, Claire May Band, began a walk through the interior of China that lasted for two years.

In 1927, Dr. Band took a position as lecturer at Yenching University in Beijing, China, where he later served as assistant professor and department chair until December 7, 1941. Pearl Harbor changed his life in a significant way: the occupying Japanese army in China began rounding up Americans in Beijing and imprisoning them in internment camps. For the next two years he and his wife lived in the forests and mountainous regions of China, where they survived a “harrowing” situation.

Eventually they made their way to the city of Chungking, where he worked as the science representative in the British embassy’s Liaison Office until January 1945. After leaving China, Dr. Band worked as a research associate at the Institute for Metals and was a fellow at the Institute for Nuclear Studies at the University of Chicago. In 1949, he became a professor at Washington State University.