

Rensselaer Physics Department

Activities

JUL 2008 – SEPT 2008

(Rensselaer Students are underlined)

HONORS AND AWARDS

Shur

- Michael Shur received 2000 Sensors Council Technical Achievement Award from IEEE Sensors Council

X.-C. Zhang

- Patent in thirty one (31) countries, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR. Method of analyzing a remotely-located object utilizing an optical technology to detect THz radiation. PCT/US2006062091. Awarded on August 1, 2008.
- Plenary Session Chair, IRMMW-THz 2008, Pasadena, CA, Sep. 15, 2008.

INVITED TALKS

Detchprohm

- “Development of High-Brightness GaInN-Based Green and Deep Green Light Emitting Diodes for Solid State Lighting Application” T. Detchprohm and C. Wetzel, Semiconductor Research Laboratory, Department of Electrical Engineering, Chulalongkorn University, Bangkok, Thailand, July 16, 2008.

T.-M. Lu

- “Shadowing growth of biaxially oriented nanostructured films”, G.-C. Wang, T.-M. Lu, and Fu Tang, SPIE, San Diego, CA, August 13, 2008.

G.-C. Wang

- “Shadowing growth of biaxially oriented nanostructured films”, G.-C. Wang, T.-M. Lu, and Fu Tang, SPIE, San Diego, CA, August 13, 2008.

X.-C. Zhang

- “THz wave air photonics,” 2nd International Symposium of Filamentation, Paris, September 25, 2009.

MEETING ATTENDANCE

Detchprohm

- Second International Symposium on Growth of III-Nitride (ISGN-2), July 6-9, 2008, Shuzenji, Izu, Japan.

Shur

- Michael Shur gave a Keynote Paper and chaired a session at IRMMW 2008 conference at Caltech (09/18/08)

G.-C. Wang

- G.-C. Wang attended SPIE, San Diego, CA, August 13, 2008.

X.-C. Zhang

- Cottrell Scholar Conference, Tucson, AZ, July 10-12
- IRMMW-THz 2008, Pasadena, CA, September 15-19
- 2nd International Symposium on Filamentation, Paris, France, September 22-25

PRESENTATIONS (presenter in bold)

Detchprohm

- **T. Detchprohm**, M. Zhu, Y. Li, Y. Xia, L. Liu, D. Hanser, and C. Wetzel, "Growth and Characterization of Green GaInN-Based Light Emitting Diodes on Free-Standing Non-Polar GaN Templates", Second International Symposium on Growth of III-Nitride (ISGN-2), July 8, 2008, Shuzenji, Izu, Japan.

G.-C. Wang

- G.-C. Wang did a presentation on exciting education and research in the physics dept. for 10 staff in charge of undergraduate recruiting from the enrollment office on Sept. 19, 2008.

X.-C. Zhang

- **X. F. Lu**, N. Karpowicz, Y. Q. Chen, X.-C. Zhang, "THz Wave Generation and Detection with Gases", IRMMW-THz 2008, Pasadena, CA, Sep. 16, 2008.
- N. Karpowicz, **J. M. Dai**, J. Chen, X.-C. Zhang, "Terahertz Time-Domain Spectroscopy with Continuous Coverage of the Entire Terahertz Range", IRMMW-THz 2008—The 33rd IRMMW- and 16th THz Electronics Conference, Pasadena, California, September 16, 2008.
- **J. M. Dai**, N. Karpowicz, Q. Song, C. L. Zhang, X.-C. Zhang, "Toward Standoff Distance Terahertz Wave Sensing", IRMMW-THz 2008—The 33rd IRMMW- and 16th THz Electronics Conference, Pasadena, California, September 18, 2008.

PAPERS PUBLISHED

T.-M. Lu

- H.-F. Li, T. Parker, F. Tang, G.-C. Wang, T.-M. Lu, S. Lee, "Biaxially oriented CaF₂ films on amorphous substrates", J. Crystal Growth 310, 3610 (2008).
- Ya Ou, Pei-I Wang, Lakshmanan H. Vanamurthy, Hassaram Bakhru, Toh-Ming Lu, and Greg Spencer, "Thermal Stability Study of Pore Sealing Using Parylene N", J. Electrochem. Soc. 155, H819-H822 (2008).
- Toh-Ming Lu, Fu Tang, and Gwo-Ching Wang, "Shadowing growth of biaxially textured nanostructured films", Proc. of SPIE vol.7041, 704107-1 (2008).
- W. Yuan, F. Tang, H. Li, T. Parker, N. LiCausi, G.-C. Wang, T.-M. Lu, and I. Bhat, "Growth of biaxial CdTe/CaF₂ films on amorphous surface", J. Crystal Growth, submitted.

G.-C. Wang

- "Biaxially oriented CaF₂ films on amorphous substrates", H.-F. Li, T. Parker, F. Tang, G.-C. Wang, T.-M. Lu, and S. Lee (US Army Armament Research, Development and Engineering Center, Benét Labs, Watervliet, NY 12189), J. of Crystal Growth 310, 3610-3614 (2008).

- “Shadowing growth of biaxially textured nanostructured films”, Toh-Ming Lu, Fu Tang, and Gwo-Ching Wang, Proc. of SPIE vol.7041, 704107-1 (2008).

Yamaguchi

- “Water vapor: An extraordinary terahertz wave source under optical excitation” Keith Johnson, Matthew Price-Gallagher, Orval Mamer, Alain Lesimple, Clark Fletcher, Yunqing Chen, Xiaofei Lu, Masashi Yamaguchi, X.-C. Zhang, Phys.Lett.A, **372**, 6037-6040(2008).

X.-C. Zhang

- Keith Johnson, Matthew Price-Gallagher, Orval Mamer, Alain Lesimple, Clark Fletcher, Yunqing Chen, Xiaofei Lu, Masashi Yamaguchi, X.-C. Zhang, “Water vapor: An extraordinary terahertz wave source under optical excitation,” Physics Letters A **372** 6037–6040 (2008).
- Hua Zhong, Cunlin Zhang, Liangliang Zhang, Yuejin Zhao, and Xi-Cheng Zhang, “A phase feature extraction technique for terahertz reflection spectroscopy”, Applied Physics Letters, **92**, 221106 (2008).

PROPOSALS (SUBMITTED or GRANTED)

T.-M. Lu

- “Biaxial semiconductor films on amorphous substrates for solar energy conversion”, I. Bhat, G.-C. Wang, T.-M. Lu, NSF, \$90K, granted in August 2008.
- “Hydrogenation/dehydrogenation in Pd-coated ultrathin Mg nanoblades: Experimental study and first-principles calculations”, G.-C. Wang, T.-M. Lu, and S.B. Zhang, NSF, \$416K for 3 years, submitted on Sept. 12, 2008.
- “Thermal Transport in Nanorod Arrays”, M. Yamaguchi and T.-M. Lu, NSF, 3 years, \$450K, submitted.
- “Reliability of Cu/ultra-low-k material systems”, Toh-Ming Lu, SRC, 3 years, \$360K, SRC, submitted.

G.-C. Wang

- Biaxial semiconductor films on amorphous substrates for solar energy conversion, I. Bhat, G.-C. Wang, T.-M. Lu, NSF, \$90K, granted in August 2008.
- REU Site in Physics at Rensselaer, G.-C. Wang, NSF, \$238 K for 3 years, submitted on August 15, 2008.
- Hydrogenation/dehydrogenation in Pd-coated ultrathin Mg nanoblades: Experimental study and first-principles calculations, G.-C. Wang, T.-M. Lu, and S.B. Zhang, NSF, \$416K for 3 years, submitted on Sept. 12, 2008.

Yamaguchi

- “Heat generation and acoustic/thermal transport in nanorod arrays”, PI Masashi Yamaguchi, collaborator Toh-Ming Lu, Aug.2008, NY state-Focus center, \$70,000 for 1 year, funded.
- “Advanced Location of Explosive Related Threats (ALERT)”, PI X.-C.Zhang, co-PIs J.Dai, E.Gagnon, M. Yamaguchi, Department of Homeland Security COE for Explosives Detection, Mitigation, and Response, Sep.2008, \$240K for Year 2009, funded.

- “High Thermal Conductivity Interface Materials From Wet-Chemically Processed Nanoparticle Network Assemblies”, PI G.Ramanath, co-PIs J.Plawsky, P.Keblinski, J.Tichy, T. Borca-Tasciuc, M.Yamaguchi, M.Carlson(SA Photonics), Aug.2008, DARPA-BAA0842 Nano thermal interface, \$1.6M for 3 years, submitted.
- “Diamond Enhanced Heat Spreader Matched Thermal Interfaces”, PI J.McDonald, co-PIs T.M.Lu, M.Yamaguchi, J.J.Lu, R.P. Kraft, T. Borca-Tasciuc, Aug.2008, DARPA-BAA0842 Nano thermal interface, \$5.5M for 3 years, submitted.
- “Thermal Transport in Nanorod Arrays”, PI M.Yamaguchi, co-PI T.M.Lu, Sep.2008, NSF CBET, \$400K for 3 years, submitted.
- “Interfacial phonon transport in materials for energy harvesting”, PI M.Yamaguchi, co-PIs S.L.Shinde, J.P.Sullivan, E.S.Piekos, T.A.Friedmann, D.L.Medlin(SNL), D.Hurley (INL), S.Aubry, (Stanford), Sep.2008, DOE BES SISGR Solar Energy Utilization, \$1.5MK for 3 years, submitted.

X.-C. Zhang

- “Advanced Location of Explosive Related Threats” X.-C. Zhang, J. Dai, E. Gagnon, M. Yamaguchi, Year One, August 15, 2008 – July 14, 2009. \$300,000, (including \$50,000 matching). DHS-ALERT. Granted.
- “High speed THz balanced detector” X.-C. Zhang, and Brian Schulkin. \$10,000, PTAP program, Optoelectronics Industry Development Association. Awarded.
- “Detection of Explosives by THz Wave Sensing,” \$61,000. One year. Raytheon. Granted.
- NATO Task Group SET-124 “Terahertz Wave Technology for Standoff Detection of Explosives and Other Military and Defense Applications” 2008. \$12,000. DHS. Granted

VISITORS TO RENSSELAER

X.-C. Zhang

- Dr. Fatemah Al-Douser, 8/13-8/26, Research Collaboration

IMPORTANT ACTIVITIES OF STUDENTS

G.-C. Wang

- Paul Morrow defended his PhD thesis entitled “Contact magnetoresistance of multilayered Co/Cu nanocolumns measured by scanning tunneling microscope” on May 30, 2008. He started working at NIST in DC in June 2008.
- Churamani Gaire successfully defended his PhD thesis entitled “Deformation behavior of amorphous-silicon (a-Si) nanostructures under monotonic and cyclic loading” on July 22, 2009. He started working at RPI in August 2008.

X.-C. Zhang

- WOFE-07 Best Paper Award: Invited paper by **N. Karpowicz**, J. Dai, X.-C. Zhang, L. Zhang, C. Zhang, “Recent developments in broadband THz spectroscopy”. July 2008.