

MARAT KHAFIZOV, PH. D.

Materials Science and Engineering
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Research Scientist with experience and publication record in condensed matter physics, optics, materials science and physical chemistry

EDUCATION

University of Rochester	Rochester, New York
Ph. D. in Physics	December 2007
Middle East Technical University	Ankara, Turkey
Bachelor of Science in Physics	June 2001

PROFESSIONAL APPOINTMENTS

Idaho National Laboratory, Associate Scientist	Idaho Falls, ID March, 2010-present
University of Rochester, Department of Chemistry Postdoctoral Research Associate	Rochester, New York December, 2007 –February, 2010
University of Rochester, Laboratory for Laser Energetics Research Assistant	Rochester, New York June, 2002 – November, 2007

PUBLICATIONS

1. "Measurement of thermal transport using time-resolved thermal wave microscopy", M. Khafizov and D. H.Hurley, *J. Appl. Physics* **110**, 083525 (2011)
2. "Effects of internal stresses and intermediate phases on the coarsening of coherent precipitates: A phase-field study", M. Asle Zaeem, H. El Kadiri, M.F. Horstemeyer, M. Khafizov, Z. Utlegulov, *Current Applied Physics*, **12**, 570 (2011)
3. "Measurement of the Kapitza resistance across a bicrystal interface", D. H.Hurley, M. Khafizov, S. L. Shinde, *J. of Appl. Physics* **109**, 083504 (2011)
4. "Multiple Exciton Generation in Single-walled Carbon Nanotubes", S. Wang, M. Khafizov, X. Tu, M. Zheng, T. D. Krauss, *Nano Lett.* **20**, 2381 (2010)
5. "Ultrafast Photoresponse of Superconductor/Ferromagnet Nano-Layered Hybrids", G. P. Pepe, D. Pan, V. Pagliarulo, L. Parlato, N. Marrocco, C. De Lisio, G. Peluso, A. Barone, U. Scotti di Uccio, A. Casaburi, F. Tafuri, M. Khafizov, T. Taneda, R. Sobolewski, *IEEE Trans. Appl. Superconductivity* **19**, 376 (2009)
6. "Nano-layered ferromagnet/superconductor heterostructures: nonequilibrium quasiparticle dynamics and photodetector applications", D. Pan, G. P. Pepe, V. Pagliarulo, C. De Lisio, L. Parlato, M. Khafizov, I. Komissarov, and Roman Sobolewski, *Phys. Rev. B* **78**, 174503 (2008)
7. "Mechanism of light detection by superconducting current-biased MgB₂ microbridges", M. Khafizov, X. Li, Y. Cui, X. X. Xi, and R. Sobolewski, *IEEE Trans. Appl. Superconductivity* **17**, 2867 (2007)

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8. "Ultrafast Carrier Dynamics and Photoresponse of Hg-Ba-Ca-Cu-O Superconducting Microbridges", X. Li, M. Khafizov, R. Sobolewski, S. Chromik, V. Strbik, M. Valerianova, P. Odier, *IEEE Trans. Appl. Superconductivity* **17**, 3648 (2007)
9. "Photomixers fabricated on nitrogen-ion-implanted GaAs", M. Mikulics, M. Marso, I. Cámara Mayorga, R. Güsten, S. Stancek and P. Kovac, Xia Li, M. Khafizov, R. Sobolewski, E. A. Michael, R. Schieder, M. Wolter, D. Buca, A. Förster, P. Kordo , and H. Lüth, *Appl. Phys. Lett.* **87**, 041106 (2005)
10. "Picosecond dynamics of the superconducting state in MgB₂" Y. Xu, M. Khafizov, L. Satrapinsky, P. Kús, A. Plecenik, J. Karpinski, J. Jun, S. M. Kazakov and Roman Sobolewski, *Physica C: Superconductivity*, **408-410**, 90 , (2004)
11. "Femtosecond optical characterization of MgB₂ superconducting thin films", Xu Y, Khafizov M, Plecenik A, Kus P, Satrapinsky L, Sobolewski R, *IEEE Trans. Appl. Superconductivity*, **13** (2), 3316-3319, (2003)
12. "Time-Resolved Photoexcitation of the Superconducting Two-Gap State in MgB₂ Thin Films" Y. Xu, M. Khafizov, L. Satrapinsky, P. Kús, A. Plecenik, and Roman Sobolewski, *Physical Review Letters*, **91**, 197004, (2003)

CONFERENCE PRESENTATIONS

1. Marat Khafizov, Anthony Schulte, Mahim Gupta, Zilong Hua, Clarissa Yablinsky, Todd Allen, David Hurley, *Gauging the influence of proton irradiation on phonon mediated thermal transport*, MRS Fall Meeting, Boston, MA (2011)
2. Bradford Loesch, Shujing Wang, Marat Khafizov, Xiaomin Tu, Ming Zheng and Todd Krauss, *Multiple Exciton Generation in Single Chirality Single-Walled Carbon Nanotubes*, MRS Fall Meeting, Boston, MA (2011)
3. M. Khafizov, D. H. Hurley, I. Park, J. Lin, J. J. Moore, R. Deskins and A. El-Azab, *Spatially resolved thermal transport in surrogate nuclear fuel materials with engineered microstructure*, EFRCs Summit and Forum, Washington, DC (2011)
4. C. Yablinsky , P. Xu, A. Schulte, M. Khafizov, D. Hurley, J. Gan, T. Allen, *Effects of Radiation and Annealing on Microstructure and Thermal Transport in CeO₂*, EFRCs Summit and Forum, Washington, DC (2011)
5. I-W. Park, J. Moore, J. Lin, M. Manuel, A. El-Azab, T. Allen, P. Xu, D. Hurley, M. Khafizov, and J. Gan, *Deposition and Post-annealing of Ceria Films Deposited by Pulsed Unbalanced Magnetron Sputtering*, EFRCs Summit and Forum, Washington, DC (2011)
6. M. Khafizov, D. H. Hurley, *Measurement of Thermal Transport Using Time-resolved Thermal Wave Microscopy*, MRS Spring Meeting, San Francisco, CA (2011)
7. M. Khafizov, D. H. Hurley, I. Park, J. J. Moore, J. Lin, R. Deskins, A. El-Azab, *Thermal Transport in Ceria Thin Films Having Engineered Microstructure*, MRS Spring Meeting, San Francisco, CA (2011)
8. W Park, J. J. Moore, J. Lin, H. Henderson, M. Manuel, A. El-Azab, T. Allen, P. Xu, D. Hurley and M. Khafizov, *Deposition and Post-annealing of Ceria Films Deposited by Pulsed Unbalanced Magnetron Sputtering*, ICMCTF 2011 (The 38th International Conference On Metallurgical Coatings And Thin Films), San Diego, CA (2011)
9. M. Khafizov, S. Wang, X. Tu, M. Zheng, T. D. Krauss, *Multiple Exciton Generation in Single-walled Carbon Nanotubes*, Functionalized NanoMaterials, Santa Fe, NM (2010)

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10. M. Khafizov, S. Wang, X. Tu, M. Zheng, T. D. Krauss, *Multiple Exciton Generation in Single-walled Carbon Nanotubes*, MRS Fall Meeting, Boston, MA (2009)
11. S. Wang, M. Khafizov, M. Zheng, T. D. Krauss, *Exciton-exciton Annihilation Dynamics in (6,5) Single-walled Carbon Nanotubes*, MRS Fall Meeting, Boston, MA (2009)
12. M. Khafizov, S. Wang, L. C. Carlson, T. D. Krauss, Y. Cui, X. X. Xi, *Exciton Dynamics in Individual Single-walled Carbon Nanotubes*, APS March Meeting, Pittsburgh, PA (2009)
13. M. Khafizov, D. Wang, X. Li, R. Sobolewski, Y. Cui, X. X. Xi, *Nonequilibrium Photoresponse of Current-Biased, Epitaxial MgB₂ Microbridges*, APS March Meeting, Baltimore, MD (2006)
14. X. Li, M. Khafizov, R. Sobolewski, S. Chromic, V. Strbik, D. De Barros, P. Odier, *Ultrafast, Time-Resolved Quasiparticle Dynamics in Hg-Based High Temperature Superconductors*, APS March Meeting, Baltimore, MD (2006)
15. M. Khafizov, X. Li, R. Sobolewski, Y. Cui and X. X. Xi, *Mechanism of light detection by superconducting current-biased MgB₂ microbridges*, ASC, Seattle, WA (2006)
16. X. Li, M. Khafizov, R. Sobolewski, S. Chromik, V. Strbik, M. Valerianova, P. Odier, *Ultrafast Carrier Dynamics and Photoresponse of Hg-Ba-Ca-Cu-O Superconducting Microbridges*, ASC, Seattle, WA (2006)
17. Y. Xu, M. Khafizov, A. Plecenik, P. Kus, L. Satrapinsky, R. Sobolewski, *Femtosecond optical characterization of MgB₂ superconducting thin films*, ASC, Houston, TX (2002)
18. Y. Xu, M. Khafizov, A. Plecenik, P. Kus, L. Satrapinsky, R. Sobolewski, *Fabrication and femtosecond photoresponse studies of MgB₂ superconducting thin films*. Ottawa, Canada (2002)

SEMINAR TALKS

1. Idaho National Laboratory, Idaho Falls, ID, September, 2009
2. Massachusetts Institute of Technology, Cambridge, MA, August 2008
3. University of Michigan, Ann Arbor, MI, July 2007
4. University of Illinois at Urbana Champaign, IL, May 2007
5. CBC Seminar, University of California, Irvine, CA, April 2007

HONORS

Membership in professional organizations: MRS (2009-current), ACS, APS, IEEE

RESEARCH PROJECTS

Study of intergranular corrosion using thermal waves (DOE LDRD) 2011-present
▪ Development of laser based thermal wave imaging to characterize intergranular corrosion in metal alloys.

Zirconium oxidation using non-linear optics (DOE LDRD) 2011-present
▪ Perform characterization of initial oxidation in zirconium alloys using Second Harmonic Generation

Thermal Transport in Nuclear Fuels (DOE BES) 2010-present
▪ Developing laser based methodology to measure thermal transport in thin films
▪ Performing thermal transport measurements in microstructure engineered ceria thin films
▪ Utilizing Boltzmann transport to modeling of thermal transport in microstructured materials

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Exciton Dynamics in Single-Walled Carbon Nanotubes (DOE BES) 2008 - 2010

- Performed transient absorption spectroscopy measurement on single chirality enriched single-walled carbon nanotubes (SWNT) and examined the physics responsible for recovery after photoexcitation
- Studied multiple exciton generation in SWNT, a promising phenomena for improved photovoltaic solar cells
- Investigated the effect of oxygen reducing agent on exciton relaxation pathway in SWNT
- Designed a transient absorption spectroscopy based on white light continuum derived from photonic crystal fibers

Photoresponse mechanism of superconducting materials (NSF, AFOSR) 2002 - 2007

- Utilized time resolved ultrafast pump probe spectroscopy to study nonequilibrium dynamics in superconducting MgB₂ thin films and single crystals
- Designed and fabricated MgB₂ superconducting microbridge structures and study of electrical response of the current-biased structure generated by optical pulse irradiation
- Developed numerical modeling of voltage transients based on the kinetic inductive and resistive voltage responses resulting from photoexcited nonequilibrium dynamics in superconducting state within frameworks of two temperature model or Rothwarf-Taylor equations
- Performed transient photoimpedance studies of current-biased photoexcited superconducting Hg-based high T_c, Nb, hybrid Nb/NiCu superconducting microbridges

CURRENT COLLABORATIONS

Dr. David Hurley, Dr Jian Gan, (Idaho National Laboratory); Prof. John Moore, Prof. Jianliang Lin, (Colorado School of Mines); Prof. Anter El-Azab, (Florida State University), Prof. Todd Allen,(University of Wisconsin); Prof. Todd Krauss, (University of Rochester)

MENTORING ACTIVITIES

Shujing Wang, Xia Li (University of Rochester) Zilong Hua (Utah State University)

SKILLS and QUALIFICATIONS

- Academic background in applied condensed matter physics and optics, supplemented by strong mathematical, computational, computer programming skills, and postdoc experience in physical chemistry
- Experimental experience includes ultrafast optical spectroscopy, optical systems, femtosecond lasers, optical characterization of nanocrystals and carbon nanotubes, low level signal detection, low temperature electrical transport, superconductivity, cryogenic temperatures, data acquisition with Labview
- Data analysis and numerical modeling with Matlab, Comsol MultiPhysics, and Origin