

Travis S. Horrom, PhD

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Scientific researcher with expertise in experimental optics, quantum optics, and atomic physics. Driven and responsible professional with experience in leadership, group work, collaboration, lab organization, scientific writing, and presenting. Technical skills including computers/programming, electronics, data analysis, lasers, and sensors. Experience presenting scientific work including talks, posters, and published peer-reviewed papers.

EDUCATION

- **PhD in Physics**..... **May 2013**
COLLEGE OF WILLIAM AND MARY, Williamsburg, VA
 - Dissertation: *Experimental Generation and Manipulation of Quantum Squeezed Vacuum via Polarization Self-Rotation in Rb Vapor*
 - Advisor: Dr. Eugeny Mikhailov
- **M.S in Physics**..... **May 2010**
COLLEGE OF WILLIAM AND MARY, Williamsburg, VA
- **B.A in Physics with minor in Mathematics**..... **May 2008**
ST. MARY'S COLLEGE OF MARYLAND, St. Mary's City, MD

RESEARCH EXPERIENCE

- **Post-Doctoral Associate** **June 2013-Present**
JOINT QUANTUM INSTITUTE, University of Maryland and the National Institute of Standards and Technology, Gaithersburg, MD.....Laser Cooling and Trapping Group
 - Plan, supervise, and participate in multiple experimental research projects on nonlinear/quantum optics. Topics include: precision measurement, quantum information, quantum cryptography, nonclassical light states, imaging.
 - Supervise and direct work of graduate students.
 - Present results in talks, posters, and scientific papers.
 - Coordinate with collaborators and vendors in procuring or repairing scientific research equipment and furthering the research program.
- **Graduate Student, Research Assistant, Teaching Assistant**..... **2008-2013**
COLLEGE OF WILLIAM AND MARY, Williamsburg, VA.....Experimental Quantum Optics Group
 - Work resulted in seven scientific publications (five first author) and many oral presentations, poster presentations, and nonrefereed papers.
 - Projects include: quantum squeezed light studies, noise and nonlinear interactions in ultra-cold atoms (collaboration with WM, ODU, and IFFC) and atomic clock experiments
- **Senior Undergraduate Research Project**..... **Fall 2007-Spring 2008**
PATUXENT NAVAL AIR STATION, Patuxent River, MD

- Senior Project: *Study of Pulse Propagation in an Ultrafast Mode-Locked Laser System*
- **Summer Undergraduate Research Fellow..... Summer 2007**
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, Gaithersburg, MD
 - Concluding Presentation: *Errors in FTIR Spectrophotometers*. NIST Optical Technology Division

TEACHING EXPERIENCE

- Astronomy Laboratory: Fall Semester 2008, Spring Semester 2009.
- General Physics Laboratory: Fall Semester 2009.
- Experimental Modern Physics: Spring Semesters 2010, 2011.

TECHNICAL SKILLS

- Computer skills, Software/programming: Matlab, Igor Pro, Mathematica.
- Optics, laser systems, noise detection, spectroscopy, precision measurements/sensors, electronics, equipment troubleshooting, data analysis, statistics, simulation/modeling.
- Scientific writing/presentations: LaTeX.

AWARDS

- NASA Virginia Space Grant Consortium Graduate Research Fellowship, 2012-2013.
- Excellence in Natural & Computational Sciences Honorable Mention- Graduate Research Symposium, 2011.
- William and Mary A&S Graduate Student Research Grant, 2010.
- Physics Department Award- St. Mary's College of MD, 2008.
- NIST Summer Undergraduate Research Fellowship, 2007.

PUBLICATIONS

- Praseon Gupta, Travis Horrom, Brian E. Anderson, Ryan Glasser, Paul D. Lett, “Multi-channel entanglement distribution using spatial multiplexing from four-wave mixing in atomic vapor.” Accepted in *Journal of Modern Optics*, arXiv:1507.02181 (2015).
- Gleb Romanov, Travis Horrom, Irina Novikova, Eugeny E. Mikhailov, “Propagation of a squeezed optical field is a medium with superluminal group velocity.” *Optics Letters*. 39, 4 (2014).
- Travis Horrom, Gleb Romanov, Irina Novikova, Eugeny E. Mikhailov, “All-atomic generation and noise-quadrature filtering of squeezed vacuum in hot Rb vapor.” *J. Modern Optics*. 60, 1 (2012).
- Travis Horrom, Robinjeet Singh, Jonathan P. Dowling, Eugeny E. Mikhailov, “Quantum-enhanced magnetometer with low-frequency squeezing.” *Phys. Rev. A*, 86, 023803 (2012).
- Travis Horrom, Irina Novikova, Eugeny E. Mikhailov, “All-atomic source of squeezed vacuum with full pulse-shape control.” *Journal of Physics B*, Issue 12, 45, 124015 (2012).
- Travis Horrom, Arturo Lezama, Salim Balik, Mark D. Havey, and Eugeny E. Mikhailov, “Quadrature noise in light propagating through a cold 87Rb atomic gas.” *J. Modern Optics*. 58, 1936 (2011).
- Travis Horrom, Salim Balik, Arturo Lezama, Mark D. Havey, and Eugeny E. Mikhailov, “Polarization Self-rotation in Ultracold Atomic 87Rb .” *Phys. Rev. A* 83, 053850 (2011).

- Eugeny E. Mikhailov, Travis Horrom, Nathan Belcher, Irina Novikova. "Performance of a prototype atomic clock based on lin||lin coherent population trapping resonances in Rb atomic vapor." JOSA B, 3, 27 (2010).

NON-REFEREED PUBLICATIONS

- Gleb Romanov, Travis Horrom, Eugeny Mikhailov, and Irina Novikova. "Slow and stored light with atom-based squeezed light" SPIE conference proceedings, vol. 8273, (2012).
- Travis Horrom, Gleb Romanov, Irinia Novikova, and Eugeny E. Mikhailov, "All atomic generation and manipulation of squeezed vacuum in hot Rb vapor," in *Frontiers in Optics*, OSA Technical Digest, paper PDPB4. (2011).

PRESENTATIONS

- "*Applications for squeezed light generated in atomic vapor.*" Talk. Naval Research Laboratory, SW Washington, DC. July 2015.
- "*Entanglement distribution using spatial multiplexing from four-wave mixing.*" Poster. Single Photon Workshop. Geneva, Switzerland. July 2015.
- "*Four-wave mixing for optical amplifiers and quantum optics.*" Talk. REU Summer Research Seminar Series, College of William and Mary, Williamsburg, VA. June 2015.
- "*SU(1,1) interferometry via four-wave mixing.*" Invited talk. Physics of Quantum Electronics. Snowbird, Utah. February 2015.
- "*Quantum Secret Sharing Using Multi-Spatial-Mode Entangled Light.*" Poster. International Conference on Atomic Physics, Washington D.C. August 2014.
- "*Multi-user continuous variable quantum secret sharing.*" Poster. Sigma Xi Postdoctoral Poster Presentation. Gaithersburg, MD. February 2014.
- "*Quantum enhanced optical magnetometry using squeezed light.*" Talk. Graduate Research Symposium. Williamsburg, VA. March 2013.
- "*Generation and manipulation of squeezed vacuum states in Rb atoms.*" Talk. Patuxent River Naval Air Station, Patuxent River, MD. December 2012.
- "*Generation and manipulation of squeezed vacuum states in Rb atoms.*" Talk. National Institute of Standards and Technology. Gaithersburg, MD. December 2012.
- "*Slow and Superluminal Squeezed Light Propagation with Rb Atoms.*" Poster. APS Division of Atomic, Molecular and Optical Physics. Anaheim, CA. June 2012.
- "*Manipulation of Squeezed Vacuum using Atomic Interactions in hot Rb.*" Talk. Graduate Research Symposium. Williamsburg, VA. March 2012.
- "*All Atomic Generation and Manipulation of Squeezed Vacuum in hot Rb Vapor.*" Talk. Frontiers in Optics/Laser Science Conference. San Jose, CA. October 2011.
- "*Polarization Self-Rotation in an Ultra-Cold Atomic Cloud.*" Poster. Graduate Research Symposium. Williamsburg VA. March 2011.
- "*Pulse Durations for an Ultrafast Mode-Locked Laser.*" Poster. St. Mary's Project Presentations. St. Mary's City MD. April 2008.
- "*Study of Sample Induced Beam Geometry Errors in FTIR Spectrophotometers.*" Talk. NIST Summer Research Symposium. Gaithersburg MD. August 2007.