Kyle Grammer

Personal Data

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Education

May 2016	PhD in Physics, **University of Tennessee**, Knoxville, TN Dissertation: *Fundamental physics with cold neutron beams* Advisor: Dr. Geoffrey Greene
June 2009	Bachelor of Science, **Ohio State University**, Columbus, OH Major: Physics and Astronomy | Minor: Economics | *graduated with Honors*

Publications

- Grammer KB, Gallmeier FX, Iverson EB. "Non-Static Surfaces in MCNPX: The Chopper Extension." Edited by Kenneth W. Herwig and Erik B. Iverson. *Journal of Neutron Research 22, no. 2–3 (October 2020): 191–98*.
- Grammer KB, Gallmeier FX. "The Small-Angle Neutron Scattering Extension in MCNPX and the SANS Cross Section for Nanodiamonds." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment 953 (2020): 163226*.
- Grammer KB and Bowman JD, "Monte Carlo calculation of the average neutron depolarization for the NPDGamma experiment", *Nucl. Instruments Methods Phys. Res. Sect. A* 942, 162336 (2019).
- Grammer KB, Gallmeier FX, Iverson EB, "A Chopper Extension to model neutron transport with non-static surfaces and high-speed moving media in MCNPX 2.7", *Nucl. Instrum. Methods Phys. Res. A*, 932:43-49 (2019).
- Blyth D, Fry J, Fomin N, et al [including Grammer KB], "First Observation of P-odd γ Asymmetry in Polarized Neutron Capture on Hydrogen", *Phys Rev Lett.* 121, 242002, (2018).
- Grammer KB, et al, "Monte Carlo calculation and verification of the geometrical factors for the NPDGamma experiment", *Nucl. Instrum. Methods Phys. Res. A*, 903:302-308 (2018).
- Musgrave MM, Baeßler S, Balascuta S, et al [including Grammer KB], "Measurement of the absolute neutron beam polarization from a supermirror polarizer and the absolute efficiency of a neutron spin rotator for the NPDGamma experiment using a polarized 3 He neutron spin-filter", *Nucl. Instrum. Methods Phys. Res. A*, 895:19-28 (2018).
- Grammer KB, Gallmeier FX, "Implementation of a small-angle scattering model in MCNPX for very cold neutron reflector studies", *J. Phys.: Conf. Ser.*, 1021(1):12060 (2018).
- Hoogerheide SF, Caylor J, Adamek ER, et al [including Grammer KB], "Progress on the BL2 beam measurement of the neutron lifetime", (accepted to *Proceedings of the International Workshop on Particle Physics at Neutron Sources PPNS 2018*).
- Fry J, Alarcon R, Allen R, et al [including Grammer KB], "Status of the NPDGamma experiment", *Hyperfine Interact.*, 238(1) (2017).

- Grammer KB, "Fundamental physics with cold neutron beams", PhD dissertation, Department of Physics and Astronomy, University of Tennessee - Knoxville, (2016).
- Grammer KB, Alarcon R, Barron-Palos L, et al, "Measurement of the scattering cross section of slow neutrons on liquid parahydrogen from neutron transmission", *Phys. Rev. B*, 180301(18):1-6 (2015).
- Bowman JD, Broussard LJ, Clayton SM, et al [including Grammer KB], "Determination of the Free Neutron Lifetime". arXiv:1410.5311 (2014).

Work Experience

Oct 2019 - Present — Neutronics Scientist at Oak Ridge National Laboratory
Instrument Development and Neutronics Group

- Developing new and maintaining existing MCNP code extensions.
- Performing shielding calculations for instruments at HFIR and SNS, and developing tools for incorporating accurate neutron guide models in MCNP.
- Measuring total cross sections for hydrogenous materials for moderators and apparatus materials common to neutron beamlines.

Oct 2016 - Oct 2019 — Postdoctoral Research Associate at Oak Ridge National Laboratory
Neutronics team

- Developed MCNPX code extension for small-angle scattering, and measured nanodiamond small angle cross section as benchmark.
- Monte Carlo studies of next generation neutron reflector materials.
- Developed MCNPX code extension for non-static surfaces.
- Studying hydrogenous materials for next-generation moderators, and performing total cross section measurements for moderator material kernels.
- Studying SNS beam monitor response and deadtime effects.

June 2010 - Oct 2016 — Graduate student at University of Tennessee
NPDGamma experiment - dissertation project

- Performed MCNPX simulations critical to analysis of experimental data.
- Discovered discrepancy in published data for parahydrogen scattering cross section, planned and conducted new measurement of this quantity.
- Assisted in maintaining data acquisition (DAQ) hardware and software as well as developing analysis codes and algorithms.
- General vacuum, cryogenics, and apparatus commissioning/diagnostics.
- Experience with neutron (He-3) and gamma (CsI) detectors.

Oct 2012 - Oct 2016 — *NIST In-beam neutron lifetime experiment - dissertation project*

- Wrote DAQ and apparatus control/monitoring software.
- Built Monte Carlo models in McStas and MCNPX for planning stages of neutron beamline collimation.
- Performed COMSOL calculations of magnetic and electric field maps and wrote charged particle tracking code in C++ for studying charged particle transport.
- Planned data storage format and developed data processing library.
- Planned and conducted experiments measuring neutron beam profile using imaging techniques to study experimental systematic effects.
- Use of silicon surface barrier and PIPS detectors for charged particle detection.
- Routine ultra-high vacuum, high voltage, and cryogenics work.

Presentations

- *The Effects of Microstructure in Neutron Beam Window Materials on Neutron Beam Properties* Presented at American Conference on Neutron Scattering (ACNS 2020); July 12-16, 2020.
- *Non-static surfaces in MCNPX: the Chopper Extension*. Paper presented at International Collaboration on Advanced Neutron Sources (ICANS XXIII); October 13-18, 2019; Chattanooga, TN.
- *The small angle neutron scattering extension in MCNPX*. Paper presented at International Collaboration on Advanced Neutron Sources (ICANS XXIII); October 13-18, 2019; Chattanooga, TN.
- *MCNPX code extensions for neutron scattering instrument background calculations*. Poster presented at Jülich Centre for Neutron Science Workshop (JCNS 2018); October 29 - November 1, 2018; Tutzing, Germany.
- *Implementation and benchmarking of small angle neutron scattering in MCNPX*. Presented at American Conference on Neutron Scattering (ACNS 2018); June 24-28, 2018; College Park, MD.
- *Implementation of a small-angle scattering model in MCNPX for very cold neutron reflector studies*. Paper presented at International Collaboration on Advanced Neutron Sources (ICANS XXII); March 27-31, 2017; Oxford, England.
- *Measurement of the Cold Neutron Scattering Cross Section on Liquid Parahydrogen*. Presented at American Conference on Neutron Scattering (ACNS 2016); July 10-14, 2016; Long Beach, CA.
- *Progress toward a new measurement of the neutron lifetime*. Presented at American Physical Society Division of Nuclear Physics Meeting (DNP 2015); October 28-31, 2015; Santa Fe, NM.
- *Progress toward a new measurement of the neutron lifetime*. Presented at American Physical Society April Meeting; April 11-14, 2015; Baltimore, MD.
- *Measurement of the Scattering Cross Section for Cold Neutrons on Liquid Parahydrogen*. Presented at American Conference on Neutron Scattering (ACNS 2014); June 1-5, 2014; Knoxville, TN.
- *A Measurement of the Total Cross Section of Liquid Parahydrogen for Cold Neutrons*. Presented at American Physical Society Division of Nuclear Physics Meeting (DNP 2013); October 23-26, 2013; Newport News, VA.
- *A Measurement of the Total Cross Section of Liquid Parahydrogen for Cold Neutrons*. Poster presented at 3rd Workshop on the Physics of Fundamental Symmetries and Interactions (PSI2013); September 8-12, 2013; Villigen, Switzerland.
- *Calculation of the Detector Solid Angles and Geometrical Factors for the NPDGamma Experiment*. Presented at American Physical Society April Meeting; March 31 - April 3, 2012; Atlanta, GA.