

Duncan H. Moseley

Ph.D. – Inorganic Chemistry – University of Tennessee, Knoxville

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Research Experience

Postdoctoral Research Assistant, (Oak Ridge National Laboratory) 2020 – present

Neutron and X-Ray Scattering and Thermophysics Group

❖ Dr. Raphaël P. Hermann - *Hybrid Excitations via Neutron Scattering*

- ◆ *Inelastic neutron scattering and neutron diffraction to study phonon and magnon effects*
- ◆ *Extensive use of Mantid, DAVE, Horace, and Gnuplot for analyzing neutron data*
- ◆ *Extensive use of Fullprof and GSAS-II for analyzing powder neutron diffraction data*
- ◆ *Collaboration with theoreticians for modelling of phonon and magnon dispersions*
- ◆ *Developed data processing scripts using Bash and Python*
- ◆ *Wrote and submitted more than 10 proposals for neutron beamtime*
- ◆ *Assisted with FWP triennial renewal preparation*

Graduate Research Assistant (University of Tennessee, Knoxville) 2014 – 2019

❖ Dr. Zi-Ling (Ben) Xue - *Spectroscopic Studies of Magnetic Properties and Spin-Phonon Coupling in Metal Complexes*

- ◆ *Combination of far-IR, Raman and inelastic neutron scattering spectroscopies to directly determine magnetic barriers of relaxation in single-molecule magnets (SMMs) and reveal spin-phonon coupling in metal complexes*
- ◆ *Synthesis of organic compounds including deuterium-labelled compounds as ligands*
- ◆ *Synthesis of transition metal and lanthanide compounds and their characterization*
- ◆ *Use of air-sensitive techniques such as Schlenk operation and glove boxes*
- ◆ *Assisted with multiple grant proposals and proposals for magnet time*

Education

University of Tennessee, Knoxville, TN

Fall 2014 – Summer 2019

Ph.D. in Inorganic Chemistry, *Spectroscopic Studies of Molecular Magnetism*

GPA: 3.43/4.00

Hendrix College, Conway, AR, *Fe-uptake by phytoplankton*

Fall 2010 – Spring 2014

Bachelor of Arts in Chemistry (ACS Certified)

GPA: 3.17/4.00

Awards

Graduate Award for Achievement in Inorganic Chemistry - UTK 2019

Extraordinary Professional Promise Citation (Chancellor's Citation Award) - UTK 2019

Odyssey Distinction Award - Hendrix College 2010

Hendrix College Award - Hendrix College 2010

Distinguished Service Award - City of Austin 2010

Eagle Scout - Boy Scouts of America 2010

Instrumentation Experience

Utilized neutron facilities at Oak Ridge National Laboratory (ORNL):

- ❖ Spallation Neutron Source (SNS):
 - ◆ Spectrometers: ARCS, HYSPEC, VISION
 - ◆ Diffractometers: POWGEN, CORELLI
 - ◆ Utilized high magnetic fields and polarization analysis
- ❖ High Flux Isotope Reactor (HFIR):
 - ◆ TAX - HB-3, DEMAND - HB-3A, POWDER - HB-2A, Alignment Station CG-1B
- ❖ Prepared & loaded samples on cryostats, aligned crystals, and collected & reduced data
- ❖ Mössbauer Spectroscopy
 - ◆ Preparing/loading samples and working with helium/vacuum lines and x-ray sources/detectors

Utilized facilities at the National High Magnetic Field Laboratory (NHMFL):

- ❖ Far-IR Spectroscopy, Raman Scattering, and Electron Paramagnetic Resonance (EPR) with superconducting and resistive magnets with fields up to 35 Tesla
- ❖ Experience filling large magnets with liquid helium and liquid nitrogen
- ❖ Prepared and loaded powder and crystalline samples on large cryostats

Familiar with magnetic susceptibility, inelastic X-ray scattering, powder X-ray diffraction, NMR, DART mass spectrometry, IR, Raman & UV-Visible spectroscopies, and DFT phonon calculations

Workshops, Seminars, and Service

- ❖ Host monthly seminars for ORNL neutron scattering scientists - 2020 – present
- ❖ Polarized Neutrons for Condensed Matter Investigations School - 2022
- ❖ Assisted with Oak Ridge Postdoctoral Association (ORPA) Annual Symposium - 2021 & 2022
- ❖ National School on Neutron & X-ray Scattering - 2020 & 2021
- ❖ ORNL Crystal Field Workshop - 2022
- ❖ Shipley's Writing Federal Proposals Workshop - 2022
- ❖ Representational Analysis and Magnetic Structure School (RAMS) - 2021
- ❖ US Muon Workshop - 2021
- ❖ Magnetic Structure Determination from Neutron Diffraction Data (MAGSTR) Workshop - 2020

Teaching Experience

- ❖ *Graduate Teaching Assistant*
 - ◆ Advanced Inorganic Lab - 2015 – 2019
 - ◆ Chemical Bonding (Group Theory) - 2016
 - ◆ General Chemistry - 2014 – 2015
- ❖ *Head Teaching Assistant* - General Chemistry - 2017 – 2018
- ❖ *Graduate Mentor* - Math & Science Center Summer Mentoring Program – 2016

Organizations

- ❖ American Physical Society, 2021 – Present
- ❖ Neutron Scattering Society of America, 2021 – Present
- ❖ Materials Research Society, 2020 – Present
- ❖ American Chemical Society, 2014 – Present

Selected Publications

- ❖ **D. H. Moseley**, K. M. Taddei, J. Yan, M. A. McGuire, S. Calder, M. M. H. Polash, D. Vashae, X. Zhang, H. Zhao, D. S. Parker, R. S. Fishman, R. P. Hermann, [Giant doping response of magnetic anisotropy in MnTe](#), *Phys. Rev. Mater.*, **6**, 014404 (2022) **Editor's Suggestion**
- ❖ B. C. Sales, W. R. Meier, D. S. Parker, L. Yin, J. Yan, A. F. May, S. Calder, A. A. Aczel, Q. Zhang, H. Li, T. Yilmaz, E. Vescovo, H. Miao, **D. H. Moseley**, R. P. Hermann, and M. A. McGuire, [Chemical Control of Magnetism in the Kagome Metal \$\text{CoSn}_{1-x}\text{In}_x\$: Magnetic Order from Nonmagnetic Substitutions](#), *Chem. Mater.*, **34**, 7069 (2022)
- ❖ R. Juneja, S. J. Thébaut, T. Pandey, C. A. Polanco, **D. H. Moseley**, M. E. Manley, Y. Q. Cheng, B. Winn, D. L. Abernathy, R. P. Hermann, L. R. Lindsay, [Quasiparticle twist dynamics in non-symmorphic materials](#), *Mater. Today Phys.*, **21**, 100548 (2021)
- ❖ **D. H. Moseley**, S. J. Thébaut, L. R. Lindsay, Y. Q. Cheng, D. L. Abernathy, M. E. Manley, R. P. Hermann, [Temperature-dependent lattice dynamics in iridium](#), *Phys. Rev. Mater.*, **4**, 113608 (2020)
- ❖ A. Jafari, B. Klobes, I. Sergueev, **D. H. Moseley**, M. E. Manley, R. Dronskowski, V. L. Deringer, R. P. Stoffel, D. Bessas, A. I. Chumakov, R. Rüffer, A. Mahmoud, C. A. Bridges, L. L. Daemen, Y. Q. Cheng, A. J. Ramirez-Cuesta, R. P. Hermann, [Phonon Spectroscopy in Antimony and Tellurium Oxides](#), *J. Phys. Chem. A*, **124**, 7869 (2020)
- ❖ **D. H. Moseley**, S. E. Stavretis, Z. Zhu, M. Guo, C. M. Brown, M. Ozerov, Y. Q. Cheng, L. L. Daemen, R. Richardson, G. Knight, K. Thirunavukkuarasu, A. J. Ramirez-Cuesta, J. Tang, Z.-L. Xue, [Inter-Kramers Transitions and Spin-Phonon Couplings in a Lanthanide-Based Single-Molecule Magnet](#), *Inorg. Chem.*, **59**, 5219 (2020).
- ❖ **D. H. Moseley**, S. E. Stavretis, K. Thirunavukkuarasu, M. Ozerov, Y. Q. Cheng, L. L. Daemen J. Ludwig, Z. Lu, D. Smirnov, C. M. Brown, A. Pandey, A. J. Ramirez-Cuesta, A. Lamb, M. Atanasov, E. Bill, F. Neese, Z.-L. Xue, [Spin-phonon couplings in transition metal complexes with slow magnetic relaxation](#), *Nat. Commun.*, **9**, 2572 (2018).

Selected Presentations

- ❖ Polarized Neutrons for Condensed Matter Investigations – July 2022, Annapolis, MD
Talk: *Field-dependence of magnons in collinear CuFeO₂*
D. H. Moseley, F. Ye, B. Winn, T. Kimura, R. S. Fishman, R. P. Hermann

- ❖ American Conference on Neutron Scattering – July 2022, Boulder, CO
Poster: *Giant Doping Response of Magnetic Anisotropy in MnTe*
D. H. Moseley (presenter), K. M. Taddei, J. Yan, M. A. McGuire, S. Calder, M. M. H. Polish, D. Vashaee, X. Zhang, H. Zhao, D. S. Parker, R. S. Fishman, R. P. Hermann

- ❖ APS March Meeting – March 2022, Chicago, IL
Talk: *Giant Doping Response of Magnetic Anisotropy in MnTe*
D. H. Moseley (presenter), K. M. Taddei, J. Yan, M. A. McGuire, S. Calder, M. M. H. Polish, D. Vashaee, X. Zhang, H. Zhao, D. S. Parker, R. S. Fishman, R. P. Hermann

- ❖ Neutron Scattering PI meeting – December 2021 (Virtual)
Poster: *Doping-Driven Transport and Magnetism in MnTe*
D. H. Moseley (presenter), M. E. Manley, K. M. Taddei, R. S. Fishman, D. S. Parker, D. L. Abernathy, R. P. Hermann

- ❖ Oak Ridge Postdoc Association Annual Symposium – July 2021, Oak Ridge, TN
Talk: *Doping-controlled Spin Reorientation in MnTe*
D. H. Moseley (presenter), K. M. Taddei, J. Yan, M. A. McGuire, S. Calder, M. M. H. Polish, D. Vashaee, X. Zhang, H. Zhao, D. S. Parker, R. S. Fishman, R. P. Hermann

- ❖ American Conference on Neutron Scattering – July 2020 (Virtual)
Poster: *Temperature Dependent Lattice Dynamics in Iridium*
D. H. Moseley (presenter), S. Thébaud, L. R. Lindsay, D. L. Abernathy, M. E. Manley, R. P. Hermann

- ❖ ORNL Neutron Scattering User Meeting – June 2019, Oak Ridge, TN
Poster: *Probing Molecular Magnetism by Inelastic Neutron Scattering*
D. H. Moseley (presenter) *et al.*

- ❖ UTK Board of Visitors Poster Session – November 2018, Knoxville, TN
Poster: *Spin-phonon coupling in single molecular magnets – far-IR and Raman*
D. H. Moseley (presenter), Z.-L. Xue, K. Thirunavukkuarasu, Z. Lu, M. Ozerov, D. Smirnov

- ❖ ACS National Meeting and Exposition – August 2018, Boston, MA
Talk: *Magneto-phonon interactions in single-molecule magnets by far-IR and Raman with magnetic field*
D. H. Moseley (presenter) *et al.*

References

- ❖ [Dr. Raphael P. Hermann](#) – Oak Ridge National Laboratory, Oak Ridge, TN
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- ❖ [Dr. Ziling \(Ben\) Xue](#) – University of Tennessee, Knoxville, TN
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- ❖ [Dr. Yongqiang \(YQ\) Cheng](#) – Oak Ridge National Laboratory, Oak Ridge, TN
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