

Roy Ready

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Education

Aug 2014–Aug 2020 Ph.D. of Physics Michigan State University, East Lansing
GPA 3.7352

Elective courses:

Data Analysis Methods—Frequentist/Bayesian methods, Monte Carlo simulations.

Machine shop—operation of heavy equipment, e.g. lathes and drill presses.

Nuclear Structure—shell model calculations.

Beam Physics—Optimization of accelerator geometry using COSY Infinity.

Aug 2014–Aug 2016 Master’s of Physics Michigan State University, East Lansing
GPA 3.7187

Aug 2012–May 2014 B.S. of Physics,
GPA 3.958 Summa Cum Laude California State University, Long Beach (CSULB),
Long Beach, CA

Aug 2008–May 2012 A.A. of Math & Science, Cypress College, Cypress, CA
GPA 3.93 with High Honors

Summer Schools:

The George Washington University Boot Camp on Nuclear Security Policy (D.C. 2019)— Nuclear security and policy lectures, site visits, final oral presentation.

U.S. Particle Accelerator School (Rutgers 2015)—Introduction to accelerator physics theory.

Experience

Sep 2015–Present Research Assistant Michigan State University, East Lansing

Upgrades for the ^{225}Ra permanent electric dipole moment (EDM) search. Surface processing and conditioning of high voltage electrodes to more than double the applied electric field used in Bishof et al., PRC 94, 025501 (2016). Fluxgate magnetometry of high-purity electrode materials in mu-metal enclosures. Development of absolute flux measurement of FRIB-harvested isotopes using laser induced fluoroscopy. Advisor: Dr. Jaideep Singh.

Jan 2019–Apr 2019 Research Assistant Lawrence Livermore National Laboratory, Livermore

Measured gamma-ray emission from a calibrated set of sources at 95 mm and 160 mm with a newly assembled high purity germanium detector system. Created a model of the detector in Geant4 and simulated detection efficiencies over a 2 MeV range. Optimized simulated efficiency curve to match experimental data, in particular solved for detector germanium dead layer thicknesses and front surface-shell window distance to high precision. Calibrated the detector efficiency to an average fractional residual within 3% using methods similar to Helmer et al. NIM 511, 360–381 (2003). Designed a position-repeatable, self-centering variable distance sample holder with a custom mount for a 4π beta counter for coincidence measurements. Supervisors: Dr. Nicholas Scielzo and Dr. Kay Kolos. Supported by the Nuclear Science and Security Consortium, MSU, and DOE.

- Feb 2018–Aug 2018 Research Assistant Argonne National Laboratory, Lemont
 Installation of high voltage upgrades to the Ra EDM experimental apparatus for upcoming EDM search of ^{225}Ra . Fluoroscopy setup and measurements of branching ratio of excited states of interest of ^{225}Ra for planned longitudinal slowing upgrade. Mentor: Dr. Matt Dietrich. Supported by the Science Graduate Student Research (SCGSR) award, MSU, and DOE.
- Jan 2015–Aug 2015 Research Assistant Michigan State University, East Lansing
 Investigation of the beam dynamics of a novel beam debuncher design. Optimized focusing components for the MSU NSCL ReA3 re-accelerator. Contributed to the design and operation of instrumentation to homogenize magnetic fields of the Fermilab Muon g-2 experiment storage ring. Advisor: Dr. Michael Syphers.
- Aug 2014–Dec 2014 Teacher Assistant Michigan State University, East Lansing
 Lab instructor for undergraduate electromagnetism course. Instruct, supervise, and grade laboratory projects. Supervisor: Dr. Joey Huston.
- Jan 2014–Jun 2014 Research Apprentice Jet Propulsion Laboratory (JPL), Pasadena
 Aug 2013–Jan 2014 SIRI intern (unpaid)
 Student Independent Research Internship (SIRI): Used image analysis software and wrote IDL image analysis program to extract normalized brightness temperature from images of Jupiter collected at the Infrared Telescope Facility.
 Research Apprenticeship Program: promotion from internship. Wrote a suite of IDL programs to analyze images of Jupiter over a period of 17 years to derive time-dependent behaviors in Jupiter's upper troposphere and lower stratosphere as an input to an atmospheric retrieval program. Participated in collection of Jupiter images using the Infrared Telescope Facility. Mentor: Dr. Glenn Orton.
- May 2013–Jul 2013 Research Assistant California State University, Long Beach,
 May 2012–Jul 2012 Long Beach
 2012: Reproduced results from Levin et al. MNRAS 324:4, 917–922 (2001) modeling neutron star dynamics and adapted model to determine maximal gravitational wave emission for quark stars.
 2013: Reproduced key results from Ouyed et al. ApJ 702:2, 1575–1583 (2009) modeling quark novae dynamics and surveyed potential galaxy reionization programs for further studies. Mentor: Dr. Prashanth Jaikumar. Funded by CSULB Research Foundation.
- Aug 2011–Aug 2012 SI Leader Cypress College, Cypress
 Supplemental Instruction (SI). Lead group study sessions and provide tutoring for undergraduate physics mechanics class. Supervisor: Dr. Ron Armale.

Honors and Awards

- Finalist Oral Presentation for Nuclear Science and Security Consortium, June 2019.
- Science Graduate Student Research Program (SCGSR), Fall 2017. DOE-funded, 3-12 month program. Recipient carries out doctoral research with the principal investigator of a DOE goal-aligned project in one of 12 national laboratories. 52 awards issued nationwide in 2017 Solicitation 1.
- Robert D. Rhodes Award, Spring 2014. Recognition of outstanding junior/senior baccalaureate student. One awarded per department.
- John & Terry Milligan Physics Scholarship, 2013–2014. Awarded for two semesters. Eligible to undergraduate physics students working part-time to pay for education. One awarded per year.

- Frank Doyle & M. Gertrude R. Doyle Scholarship, 2013. Duration of one year. Eligible to alumni from select community colleges. Awards based on applicants' timeline for achieving their academic goals.
- CSU Future Scholar, Long Beach, 2013. Eligible to disadvantaged students educated in California. Recipient articulates professional objectives in the context of their educational background.
- Jet Propulsion Laboratory Undergraduate Scholar (JPLUS), 2011. Awarded to leading students in STEM fields from each of 25 different community colleges in Southern California. Summer series of weekly STEM seminars hosted at California Institute of Technology (Caltech) in Pasadena.

Publications

- “Surface Processing of High Voltage Electrodes for the Ra EDM Experiment,” **R. Ready**, K. G. Bailey, M. Bishof, M. R. Dietrich, F. Fang, B. Hanley, J. Huneau, P. Lalain, P. Mueller, T. P. O'Connor, J. O'Kronley, A. Powers, T. Rabga, J. Singh (to be submitted to NIM)
- “Spectroscopic Studies and the Lifetime Measurement of the $6d7p\ ^3F_2^o$ state of radium,” D. Booth, T. Rabga, **R. Ready**, K. G. Bailey, M. Bishof, M. R. Dietrich, J. P. Greene, P. Mueller, T. P. O'Connor, J. T. Singh (submitted to PhysRevA)
- “Conceptual Design Of A Ring For Pulse Structure Manipulation Of Heavy Ion Beams At The MSU NSCL,” A. Pham, S. Lund, **R. Ready**, M. Syphers, and C.Y. Jonathan, NAPAC-2016-TUA1CO05.

Presentations

- “Towards a More Sensitive Measurement of the Atomic Electric Dipole Moment of Radium-225,” APS March Meeting, Mar 2020. Video: meetings.aps.org/Meeting/MAR20/Session/P01.2
- “Upgrades for an improved measurement of the Electric Dipole Moment of ^{225}Ra ,” MSU, Jan 2020
- “Towards Precision Gamma-Ray Intensity Measurements of Long-Lived Fission Products,” Nuclear Science and Security Consortium Fall Workshop & Advisory Board Meeting, Livermore, Oct 2019
- “Towards precision gamma-ray branching ratio measurements of Neodymium-147 and Europium-156,” Defense Nuclear Nonproliferation Research & Development UPR, Raleigh, Jun 2019
- “Towards a more sensitive measurement of the permanent electric dipole moment of ^{225}Ra ,” talk, APS April Meeting, Denver, Apr 2019
- “Upgrades for an improved measurement of the Electric Dipole Moment of ^{225}Ra ,” talk, MSU, Spring 2019
- “Towards a more sensitive measurement of the permanent electric dipole moment of ^{225}Ra ,” talk, MSU, Spring 2019
- “High Voltage Upgrades for the ^{225}Ra Electric Dipole Moment Search,” poster, Midwestern Cold Atom Workshop, University of Illinois at Urbana-Champaign, Fall 2018
- “Upgrades for an improved measurement of the Electric Dipole Moment of ^{225}Ra ,” first committee meeting talk, MSU, Nov 2016
- “Upgrades for an improved measurement of the EDM of ^{225}Ra ,” talk, Division of Nuclear Physics, Vancouver, Oct 2016
- “An Update of the Spinlab Radium-225 EDM Electrode Development,” talk, MSU, May 2016
- “High Voltage Upgrades for the ^{225}Ra Electric Dipole Moment Search,” poster, Midwestern Cold Atom Workshop, University of Chicago, Oct 2016
- “Status of Magnetization Measurements of the Ra-225 EDM Electrodes: Phase 5,” talk, MSU Annual EDM Meeting, Apr 2016
- “Progress Towards 300 kV/cm Electric Field for ^{225}Ra Electric Dipole Moment Search,” poster, Midwestern Cold Atom Workshop, University of Wisconsin-Madison, Nov 2015

Long-Term Time Variability of Temperature, Gas Abundance and Cloud Fields in Jupiter From Thermal Emission Observations,” G. S. Orton, L. N. Flether, P. A. Yanamandra-Fisher, B. Fisher, T. K. Greathouse, S. Kim, **R. Ready**, J. Liu, T. Schneider, AGU Fall Meeting , Dec 2014

“Measuring Raw Magnetite,” class presentation, CSULB, May 2014

“Compiling a 3D Map of Jupiter’s Atmosphere,” research methods talk, CSULB, May 2014

“Report: ‘Evidence for the existence of the astrophysically important 6.40-MeV state of ^{31}S ’”, Apr 2014

“Applications of Photolithography,” research methods talk, CSULB, Feb 2014

“Seasonal and non-seasonal temperature variations in Jupiter’s upper troposphere,” talk, JPL, Jan 2014

“Seasonal Variations in Jupiter’s Tropospheric Temperatures,” talk, CSULB, Fall 2013

“MOSFET Clean Boost Guitar Pedal,” class presentation, CSULB, May 2013

Skills

Proficiency in C++, ROOT, Geant4, Python

Proficiency in MATLAB, LabView, Wolfram Mathematica

Experience with COMSOL finite element software

Working knowledge of C, IDL, COSY Infinity, FORTRAN

Proficiency in clean room design, construction, validation, and operation

Experience in high voltage system design, high voltage power supply interfacing circuitry

Experience in high voltage gradient surface processing

Experience in high vacuum system construction, maintenance, diagnosing, baking

Experience with roughing pumps, TMPs, non-evaporable getters, TSPs, and ion pumps

Strong safety background from working at FRIB, NSCL, ANL, LLNL, JPL, Fermilab

Experience in team and project management

Strong background in physical and electronic documentation of work

Experience with fluoroscopy and spectroscopy optics system design

Experience with operation and design of diode, Ti:Sapphire lasers

Experience with fluxgate magnetometry equipment

Experience with lathes, mills, bandsaws, drill presses, pipe welding, etc.

Experience in design of signal conditioning, filtering, safety interlock, instrument protection circuitry

DIY car brakes, suspension, engine, carpentry, plumbing enthusiast

Computer hardware, audio system, audio recording enthusiast

Habitat for Humanity volunteer

Outreach

Women and Minorities in the Physical Sciences (WaMPS) Graduate Mentor

FRIB Open House tour stop speaker

MSU Physics Graduate Organization Seminar Leader

Sigma Pi Sigma Member, Society of Physics (SPS) Officer (Long Beach Chapter, 2013-2014)

Mexican American Engineering Society (MAES) Science Extravaganza Workshop Class leader