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Education

University of Washington, Seattle; Ph.D. Physics, May 1998.

Thesis: *"Measurement of the parity nonconserving spin-rotation of transmitted cold neutrons through a liquid helium target."*

Honors: Physics Department Fellowship 1987-88

Advisors: BR Heckel, EG Adelberger

University of California, Berkeley; M.S. Nuclear Engineering, June 1986.

Thesis: *"Analysis of proposed gamma-ray detection system for the monitoring of core water inventory in a pressurized water reactor."*

Honors: Nuclear Science, Engineering, Health Physics Fellow (DoE) 1983-86

Advisors: SG Prussin (UC), A DeVolpi (ANL)

University of California, Berkeley; B.S. Engineering Physics, B.A. Applied Math, June 1983.

Honors: Phi Beta Kappa, Tau Beta Pi (1983)

Institute for Nuclear Power Operations (INPO) Scholarship (1982-83)

Pacific Gas & Electric Co. Career Scholarship for Nuclear Engineering (1981-83)

Professional Experience

2018-present	Professor of Physics, Department of Mathematics and Physics, North Carolina Central University
2022-present	Adjunct Professor, Department of Physics, Duke University
2008-2018	Associate Professor, Department of Physics, North Carolina Central University
2004-2008	Assistant Professor, Department of Physics, North Carolina Central University
2004-2006	Adjunct Assistant Professor, Department of Physics, North Carolina State University and Triangle Universities Nuclear Laboratory (TUNL)
2001-2004	Research Assistant Professor, Department of Physics, North Carolina State University and TUNL
1998-2001	Postdoctoral Research Associate, Department of Physics, North Carolina State University and TUNL
1996-1997	Visiting Scientist, Ionizing Radiation Division, National Institute of Standards and Technology, Gaithersburg, MD

Research Activities

Neutrino Physics: COHERENT Collaboration

The COHERENT collaboration seeks to measure the coherent elastic neutrino-nucleus scattering (CEvNS) cross sections in various target materials including CsI, NaI, liquid Ar, Ge using the Spallation Neutron Source at the Oak Ridge National Laboratory as a source of pulsed neutrinos. COHERENT published the first observation of CEvNS in a Science article in 2017. Participated in the development of the upgrade of the prototype NaI detector, NaIvE, including the muon veto system. Participating in the development, construction, deployment and testing of a ton-scale NaI detector (NaIvETe) and 18 kg Ge detector (Ge-mini). NCCU students characterized the repurposed NaI crystals for the ton-scale detector, participating in the construction of the electronics bases and contributing to the construction and deployment of the detector array. Developing program for measuring inelastic neutrino scattering to test lower than expected cross section observations by deploying Pb-glass and BGO detectors. Working with the Barbeau group at Duke University to measure quenching factors in the target materials of interest as needed for understanding detector response in support of the coherent measurements. Supervised NCCU students who assembled a large fraction of the crystal detectors, were involved in the soldering of the electronics and participated in the characterization of many of the 200 'backing detectors' for an upgrade to the quenching factor configuration. Serve as the co-convenor of the NaI Detector Working group, as the speakers coordinator and member of the Diversity and Inclusion committee for the COHERENT collaboration.

Neutrino Physics: KamLAND and KamLAND-Zen Collaborations

Member of the US-Japan collaboration for KamLAND, the Kamiokande Liquid-scintillator, Anti-Neutrino Detector. Organized and participated in the performance testing of 20" photomultiplier tube (PMT) detectors and the design, construction, and installation phase for mounting the 225 PMTs in the outer-detector (OD), veto-counter region. Worked with NCState graduate student in analysis of OD efficiency to detect muons and estimated neutron background events in the main detector. Assisted the Univ. of Hawaii graduate student with OD tube calibration. Supervised undergraduate student in the study of high-rate OD PMTs. The KamLAND neutrino-oscillation experiment compared the expected to measured low-energy anti-neutrino flux from nuclear power reactors located 150-200 km away. Global analysis of solar neutrino experiments and KamLAND measurements greatly restricted the square of the neutrino mass difference parameter, Δm^2 . The collaboration published results on neutrino oscillations, rates of extraterrestrial anti-neutrinos, ^8B solar neutrino flux, and geo-neutrino rates.

The significant contribution of the KamLAND results to the advancement of neutrino oscillations was acknowledged with the Breakthrough Prize Award in Fundamental Symmetries 2016.

KamLAND-Zen, began in fall 2011 with the insertion of ^{136}Xe loaded scintillator into the center region of the detector to measure double beta-decay rates. Initial results on 2ν double beta decay rate were published in 2011 with an update in 2019, and limits for the 0ν double beta decay rate was published in 2012. The most recent KamLAND-Zen 800 results published in 2022 provide the most stringent limit on 0ν double beta decay by reaching the inverted hierarchy region. Assisted with studies carried out at TUNL to determine alpha-particle backgrounds in the detector. Participated in various detector activities including the 2017 upgrade with a renewed outer veto system and to a larger Xenon volume (800 kg) for increased sensitivity to the 0ν double beta decay signal. Serve as the remote shift coordinator, and on paper committees.

Neutrino Physics: NuLat Collaboration - Participation Ended 2022

Development of the "ROL5³" demonstration detector, a Rhagavan Optical Lattice based on 125 ⁶Li doped plastic scintillator cubes in a 5x5x5 lattice to measure antineutrinos with good background rejection based on high spatial segmentation and precise energy and timing resolution. The ROL detector design forms the basis of the Neutrino Lattice, NuLat, experiment to search for sterile neutrino searches at reactors, and for reactor monitoring. Participating in the development of the prototype being built and tested at Virginia Tech to be deployed at the National Institute of Standards and Technology (NIST) reactor and at a commercial power plant. Working with Virginia Tech and University of Hawaii graduate students on the construction and simulations of the prototype.

Few-Body Interactions

The "Compton" group at TUNL with collaborators from various institutions including George Washington Univ and Univ Kentucky, seeks to measure the electromagnetic dipole polarizabilities of the proton using Compton scattering of linearly polarized photons produced at the Duke Free Electron Laser Laboratory. The various targets include helium, deuterium, and hydrogen all at cryogenic temperatures. Support the cryogenic efforts, providing assistance with target activities and development. Participated in the helium-4, deuterium, and hydrogen data runs and assisted with the helium-3 target development. Results from hydrogen and helium were published.

Nucleon-Nucleon Interaction - Initial Project Completed

Participated in measurements of the neutron-deuteron cross section in the star configuration using the TUNL Tandem accelerator facility. Co-supervised NCCU undergraduate students in the design, construction and testing of the new target system. Participated in the apparatus assembly, and in the acquisition of data during both test runs of the experimental set-up and in final data runs. The experiment activities included starting and maintaining beam in the 9 MV Tandem Van de Graaff accelerator system. Results were published for 16 MeV and 19 MeV incident neutron energies showing large discrepancies in both the "coplanar" and "space-star" final-state configurations. Our measurements uphold the "space-star anomaly" we initially intended to address that is one of several 3-nucleon observables the current theoretical models are unable to predict.

NCCU participated in the redesign of the apparatus to simultaneously measure the neutron-neutron and neutron-proton quasi-free scattering cross section through the neutron-deuteron breakup reaction at 19 MeV. Theoretical models agree with neutron-neutron scattering data while the neutron-proton data disagree with the predictions. This is another example of a 3-nucleon observable with discrepancies between data and theory that can be used to further understand multi-nucleon models. Assisted a masters' degree student with the initial design and drawings of the new target apparatus. Participated in the recent measurements carried out at the TUNL lab which were the responsibility of a Duke Ph.D. student. Results for 10 MeV were published showing agreement with theoretical calculations.

Photo-nuclear Reactions - Project Completed

Member of the collaboration to measure photofission and photoneutron reaction probabilities and angular distributions as a means to develop a new method for interrogating special nuclear materials based upon polarized (γ, n) reaction asymmetries. A beam of polarized γ -rays is sent onto a target of uranium, plutonium or metals including beryllium, cadmium, and lead. These experiments were performed at the High Intensity Gamma-ray Source (HI γ S) facility located at TUNL on the Duke University Campus. Supervised NCCU graduate student with his M.S. thesis project to determine the (γ, n) asymmetries from a beryllium target. Participated in the experiment set-up and data acquisition runs. Initial analysis of the beryllium target data was completed by the NCCU student and relatively large asymmetries were measured from 5 MeV to 15 MeV. Additional analysis including nuclear models to understand the origin of these asymmetries was done by a Duke University Ph.D. student and published in 2015.

Teaching Experience and Curriculum Development (2017 to present)

Associate Professor; Professor (Physics Dept.) NC Central Univ., Durham, NC (2008 - present)
Taught majors courses Quantum Mechanics, Modern Physics and Mathematical Methods in Physics; the calculus-based Fundamentals of Physics for Scientists and Engineers I (mechanics), II (electricity and magnetism) courses; introductory laboratory courses Laboratory I (mechanics) and II (electricity and magnetism) and Advanced Laboratory I (Modern Physics lab). Changed the Mathematical Methods course content to focus on skills needed for senior level courses.

Responsible for lectures, homework, laboratory work, exams and all grading. Student Ratings out of 5.0, between 4.5-5.0 for majors' courses and 3.5-4.0 for general science courses.

(2017 - present) Assessment coordinator for the B.S. and M.S. physics degree programs.

(Spring 2024) Taught the first graduate level Nuclear Physics course elective
Developed materials for nuclear physics and particle physics relevant material including nuclear models, the standard model of particle physics, symmetries and detector technology.

(2019-22) Supervised undergraduate student in the development of a Conceptual Physics course. Creating physics problem solving course, "Thinking Physics", and special topics courses in physics.

Teaching Collaborations with Duke University Faculty

HEP 101 Seminar Series (Spring 2016 - 2024)

Joined High-Energy Physics faculty to present detector basics to the students participating in this extracurricular seminar series in the Spring semester to prepare students for summer internships in HEP research. An NCCU student participated in the 2017 seminar series and a Durham Tech student doing work at NCCU participated spring 2023.

PHYS 131S Big Ideas in Physics Course (Summer 2018, 2019)

Co-taught summer course for visiting high-school students and Duke students completing a general education science requirement. Topics focused on nuclear physics experimental techniques with applications to art, archaeology, and forensics. Presentations included accelerator physics, detector technology, and spectral analysis.

Organized tours of the TUNL accelerator facilities. Reviewed papers written on this part of the course. Assisted students with end of course presentations.

Presentations for Students (2017 - 2024)

Nuclear Physics Techniques to Reveal What We Don't See (August 2022) Durham, NC

Guest lecture for Duke University Pre-College offering called "Particle Physics: Seeing the Invisible World." Presentation included explaining detection techniques and analysis for seeing under drawings of paintings, revealing hidden paintings, making ancient writing legible, and using muon tomography to see inside volcanoes and ancient pyramids.

"Detectors in Nuclear and Particle Physics" (May 2018, 2019, 2021 - 2024) TUNL, Durham, NC
Introductory lecture on detection concepts for the TUNL summer student interns.

Nuclear Physics Techniques Applied to Archaeology and Artifacts (Summers 2020, 2022, 2023)

Advances in Physics seminar for the summer research experiences for undergraduates (REU) program and open to all. TUNL, Durham, NC

What Nuclear Physics Techniques can Reveal About Cultural Artifacts (Summer 2019)

Advances in Physics seminar for the summer research experiences for undergraduates (REU) program and open to all. TUNL, Durham, NC

Second presentation for Duke Talent Identification Program (TIP) group of high-school students. The presentation was modified from the TUNL REU version to be appropriate for high-school students. Duke University, Durham, NC.

What Nuclear Physics Techniques can Reveal About Cultural Artifacts (Summer 2023)

Seminar as above tailored to high school students in the NCCU summer internship program.

"Radioactivity in Real Life" (July 2017, June 2018) NCCU, Durham, NC

Introductory lecture on radioactivity and radiation for the high-school summer program.

Public and Outreach Presentations (2017 - 2024)

How Physics Reveals the Hidden Stories of Paintings Raleigh, NC; Nov. 2018

NC Museum of Natural Sciences Science Cafe presentation to general audience.

Observation to Information: How we Learn Astronomy Fun Facts Durham, NC, Dec. 2023

Astronomy on Tap lecture series at Fulsteam Brewery. Presentation on the physics behind observations to characterize astronomical objects and the history of the universe.

Invited Talks - Workshops, Meetings, Seminars (2017 - 2024)

Coherent Elastic Neutrino-Nucleus Scattering (CEvNS) – From Observation to Impact, April American Physical Society Meeting Invited Session M12, Sacramento, CA, April 2024.

Backgrounds in CEvNS Measurements The CEvNS-Neutrino School, Technical University of Munich, March 2023.

What's up in Neutrino Alley: Neutrino Nucleus Scattering, University of North Carolina, Wilmington, Physics and Physical Oceanography Department, Wilmington, NC, January 2023.

Engaging Minority Serving Institutions in Fundamental Symmetries, Neutrons and Neutrinos Research, Long Range Plan FSNN Town Hall meeting, Chapel Hill, NC, December 2022.

Coherent Elastic Neutrino-Nucleus Scattering Experiments, Double Beta-Decay Workshop DBD2018, Waikaloa, Hawaii, October, 2018.

Coherent Elastic Neutrino-Nucleus Scattering (CEvNS): Doing Big Physics With Small Neutrino Detectors, Colloquium, Louisiana State University Physics Dept., Baton Rouge, LA, Feb 2018.

Publications 2017 - 2024

Barbeau, P. *et al.* (COHERENT Collaboration including D.M. Markoff and NCCU grad student N. Ogoi) Accessing new physics with an undoped, cryogenic CsI CEvNS detector for COHERENT at the SNS. *Phys. Rev. D* 109.092005 (2024).

Ding, K., Liu J., Yang Y., Scholberg K., and Markoff, D.M., Performance of a liquid nitrogen cryostat setup for the study of nuclear recoils in undoped CsI crystals, *Nucl. Instrm. Meth. A*, 169283 (2024).

An, P. *et al.* (COHERENT Collaboration including D.M. Markoff and NCCU alumni A. Brown, J. Ross, E. Ujah) Measurement of Electron-Neutrino Charged-Current Cross Sections on ^{127}I with the COHERENT NaIvE Detector. *Phys. Rev. Lett.* 131.221801 (2023).

An, P. *et al.* (COHERENT Collaboration including D.M. Markoff and NCCU undergrad alumni A. Brown, J. Ross, E.Ujah) Measurement of $^{nat}\text{Pb}(\nu_e, \text{Xn})$ production with a stopped-pion neutrino source. *Phys. Rev. D* 108.072001 (2023).

Akimov, D. *et al.* (COHERENT Collaboration including D.M. Markoff and NCCU undergraduate student E. Ujah), First Probe of Sub-GeV Dark Matter beyond the Cosmological Expectation with the COHERENT CsI Detector at the SNS. *Phys. Rev. Lett.* 130.051803 (2023).

Abe, S. *et al.* (KamLAND-Zen Collaboration including D.M. Markoff) Measurement of cosmic-ray muon spallation products in a xenon-loaded liquid scintillator with KamLAND. *Phys. Rev. C* 107.054612 (2023).

Abe, S. *et al.* (KamLAND Collaboration including D.M. Markoff) First measurement of the strange axial coupling constant using neutral-current quasielastic interactions of atmospheric neutrinos at KamLAND. *Phys. Rev. D* 107,072006 (2023).

Abe, S. *et al.* (KamLAND-Zen Collaboration including D.M. Markoff) Search for the Majorana Nature of Neutrinos in the Inverted Mass Ordering Region with KamLAND-Zen, *Phys. Rev. Lett.* 130, 051801 (2023).

Publications (2017 - 2024) Continued

R.C. Malone, A.S. Crowell, L.C. Cumberbatch, B.A. Fallin, F.Q.L. Friesen, C.R. Howell, C.R. Malone, D.R. Ticehurst, W. Tornow, D.M. Markoff, B.J. Crowe, and H. Witała. Measurement of the 1S_0 neutron-neutron effective range in neutron-deuteron breakup, *Phys. Lett. B* **835** 137557 (2022).

Akimov, D. *et al.* (COHERENT Collaboration) Monitoring the SNS basement neutron background with the MARS detector, *JINST* 17 P03021 (2022).

Akimov, D. *et al.* (COHERENT Collaboration including D.M. Markoff) Simulating the neutrino flux from the Spallation Neutron Source for the COHERENT experiment, *Phys. Rev. D* 106, 032003 (2022).

Akimov, D. *et al.* (COHERENT Collaboration including D.M. Markoff) COHERENT constraint on leptophobic dark matter using CsI data, *Phys. Rev. D* 106, 052004 (2022).

Abe, S. *et al.* (KamLAND Collab including D.M. Markoff), Limits on astrophysical antineutrinos with the KamLAND experiment, *Astrophysical Journal*, 925; (2022). arXiv:2108.08527

Abe, S. *et al.* (KamLAND Collaboration) Search for Solar Flare Neutrinos with the KamLAND detector. *The Astrophysical Journal*, Volume 924, Number 2, Page 103 (2022).

Abe, S. *et al.* (KamLAND Collaboration) KamLAND's search for correlated low-energy electron antineutrinos with astrophysical neutrinos from IceCube. *Astropart. Phys.*, **143**, 102758 (2022).

Abe, S. *et al.* (KamLAND Collaboration) Abundances of Uranium and Thorium Elements in Earth Estimated by Geoneutrino Spectroscopy, *Geophys. Res. Lett.* **49**, 16, e2022GL099566 (2022). [Journal Highlight]

Abe, S. *et al.* (KamLAND Collaboration) Search for Supernova Neutrinos and Constraint on the Galactic Star Formation Rate with the KamLAND Data, *ApJ* 934, 85 (2022).

Akimov, D. *et al.* (COHERENT Collaboration) Measurement of scintillation response of CsI[Na] to low-energy nuclear recoils by COHERENT. *JINST* 17 P10034 (2022).

Akimov, D. *et al.* (COHERENT Collaboration) A D_2O detector for flux normalization of a pion decay-at-rest neutrino source, *JINST* 16 P08048 (2022).

X. Li, M.W. Ahmed, A. Banu, C. Bartram, B. Crowe, E. J. Downie, M. Emamian, G. Feldman, H. Gao, D. Godagama, H. W. Grißhammer, C. R. Howell, H. J. Karwowski, D. P. Kendellen, M. A. Kovash, K. K. H. Leung, D. M. Markoff, J. A. McGovern, S. Mikhailov, R. E. Pywell, M. H. Sikora, J. A. Silano, R. S. Sosa, M. C. Spraker, G. Swift, P. Wallace, H. R. Weller, C. S. Whisnant, Y. K. Wul, and Z. W. Zhao Proton Compton Scattering from Linearly Polarized Gamma Rays, *Phys. Rev. Lett.* 128, 132502 (2022).

Gando, Y. *et al.* (KamLAND-Zen Collaboration) The nylon balloon for xenon loaded liquid scintillator in KamLAND-Zen 800 neutrinoless double-beta decay search experiment, *JINST* 16 P08023 (2021).

Abe, S. *et al.* (KamLAND Collaboration) Search for Low-energy Electron Antineutrinos in KamLAND Associated with Gravitational Wave Events, *ApJ* **909**, 116 (2021).

D. Akimov, *et al.* (COHERENT Collaboration) First Detection of Coherent Elastic Neutrino-Nucleus Scattering on Argon, *Phys. Rev. Lett.* 126, 01200 (2021).

Publications (2017 - 2024) Continued

Akimov, D. *et al.* (COHERENT Collaboraiton) Development of a ^{83m}Kr source for the calibration of the CENNS-10 liquid argon detector, JINST 16 P04002 (2021).

Akimov, D. *et al.* (COHERENT Collaboration) Sensitivity of the COHERENT Experiment to accelerator-produced dark matter. Phys. Rev. D 102, 115020 (2020).

X. Li, M.W. Ahmed, A. Banu, C. Bartram, B. Crowe, E.J. Downie, M. Emamian, G. Feldman, H. Gao, D. Godagama, H.W. Griebhammer, C.R. Howell, H.J. Karwowski, D.P. Kendellen, M.A. Kovash, K.K.H. Leung, D. Markoff, S. Mikhailov, R.E. Pywell, M.H. Sikora, J.A. Silano, R.S. Sosa, M.C. Spraker, G. Swift, P. Wallace, H.R. Weller, C.S. Whisnant, Y.K. Wu, and Z.W. Zhao, Compton scattering from ^4He at the TUNL HIgS facility, Phys. Rev. C 101, 034618 (2020).

Malone, R.C., A.S. Crowell, L.C. Cumberbatch, B.A. Fallin, F.Q.L. Friesen, C. R. Howell, C.R. Malone, D.R. Ticehurst, W. Tornow, D.M. Markoff, B.J. Crowe, and H. Witala, Neutron neutron quasifree scattering in neutron-deuteron breakup at 10 MeV. Phys. Rev. C101, 034002 (2020).

Swanson, H.E., B.R. Heckel, C.D. Bass, T. D. Bass, J. M. Dawkins, J. C. Horton, D. Luo, W. M. Snow, S. B. Walbridge, B. E. Crawford, K. Gan, A. M. Micherdzinska, C. Huffer, D.M. Markoff, H.P. Mumm, J.S. Nico, M. Sarsour, E.J. Sharapov, and V. Zhumabekova, Experimental upper bound and theoretical expectations for parity-violating neutron spin rotation in ^4He , Phys. Rev. C 100, 015204 (2019).

Gando, A. *et al.* (KamLAND-Zen Collaboration) Precision measurement of the ^{136}Xe two-neutrino spectrum in KamLAND-Zen and its impact on the quenching of nuclear matrix elements, Phys. Rev. Lett. **122**, 192501 (2019).

Sikora, M., M.W. Ahmed, A. Banu, C. Bartram, B. Crowe, E. J. Downie, G. Feldman, H. Gao, H.W. Griebhammer, H. Hao, C.R. Howell, H.J. Karwowski, D.P. Kendellen, M.A. Kovash, X. Li, D.M. Markoff, S. Mikhailov, V. Popov, R.E. Pywell, J.A. Silano, M. Spraker, P. Wallace, H.R. Weller, C.S. Whisnant, Y.K. Wu, W. Xiong, X. Yan, and Z.W. Zhao, Compton scattering from ^4He at 61 MeV, Phys. Rev. C 96, 055209 (2017).

Akimov, D. *et al.* (COHERENT Collaboration) Observation of coherent elastic neutrino-nucleus scattering, Science 10.1126/science.aao0990 (2017). [Featured on cover.]

White Papers (2017-2024)

Fundamental Symmetries, Neutrons, and Neutrinos (FSNN): Whitepaper for the 2023 NSAC Long Range Plan, B. Acharya *et al.* 2022 Town Meeting for Fundamental Symmetries, Neutrons and Neutrinos, which took place December 13-15, 2022 in Chapel Hill, NC, arXiv:2304.03451.

Physics Opportunities in the ORNL Spallation Neutron Source Second Target Station Era. Asaadi *et al.* (including D.M. Markoff) arXiv:2209.02883. (Snowmass)

The COHERENT Experimental Program. COHERENT Collaboration, arXiv:2204.04575 April 2022. (Snowmass)

Coherent elastic neutrino-nucleus scattering: Terrestrial and astrophysical applications. M. Abdullah *et al.* (including D.M. Markoff) arXiv:2203.07361 March 2022 (Snowmass).

Recoil imaging for directional detection of dark matter, neutrinos, and physics beyond the Standard Model. C.A.J. O'Hare *et al.* (D.M. Markoff) arXiv:2203.05914 2022 (Snowmass).

COHERENT 2018 at the Spallation Neutron Source. COHERENT Collaboration, arXiv:1803.09183 March 2018.

Conference Proceedings (2017-2024)

D.M. Markoff (for the COHERENT Collaboration), The COHERENT low-energy neutrino scattering program at the ORNL Spallation Neutron Source, Mini-symposium Session F12 on Low-energy Neutrino Interactions, April APS Meeting, Sacramento, CA, April 3-6, 2024.

N. Ogoi (for the COHERENT Collaboration), Proposed Lead Glass Detector for Measuring Charged Current Neutrino Scattering, Poster session, NSBP Annual Meeting, October 9 - 12, 2024. [NCCU MS thesis research, Markoff advisor.]

D. M. Markoff, A. Ahmed, C.R. Jackson (NCCU); A. Crowell, P.S. Barbeau, C.R. Howell, (Duke); J. Gruzsko (UNC-CH); R. Longland, M. Green (NCSU), Research Traineeship to Broaden Participation in Nuclear Physics at TUNL, APS Division of Nuclear Physics Meeting Minisymposium on Inspiring the Next Generation Through Nuclear Research, New Orleans, LA, October 27-30, 2022.

D. M. Markoff (for the COHERENT Collaboration), The COHERENT neutrino scattering program at the ORNL Spallation Neutron Source, APS April meeting, New York, NY, April 9-12, 2022.

E. Ujah (for the COHERENT Collaboration), NaI[Tl] Detector Characterization for Coherent Elastic Neutrino-Nucleus Scattering, Southeastern Section of the APS, Tallahassee, FL, November 18-20, 2021. [NCCU undergraduate research, Markoff advisor.]

D. M. Markoff (for the COHERENT Collaboration), Neutrino-nucleus Scattering Studies with the COHERENT Multi-ton NaI Array, APS Division of Nuclear Physics, Virtual (MIT), October 11-14, 2021.

D. M. Markoff (for the COHERENT Collaboration), A Ton-Scale NaI Detector for Neutrino-Nucleus Scattering Measurements, XXIX International Conference on Neutrino Physics and Astrophysics, Neutrino2020, poster presentation, Virtual, June 22 - July 2, 2020.

Conference Proceedings (2017-2024) (continued)

E. Ujah and J. Sibley (for the COHERENT Collaboration), Characterization of the NaI[Tl] Crystals for the Ton-scale Detector Array, Magnificent CEvNS Workshop, Chapel Hill, NC, November 9-11, 2019. [NCCU undergraduate research; Markoff advisor.]

E. Ujah, J. Sibley, S. Hedges, P. Barbeau, D. Markoff, NaI[Tl] Detector Characterization for Coherent Elastic Neutrino Nucleus Scattering, CEvNS, Southeastern Section of the APS (SESAPS), Wrightsville Beach, NC, November 7-9, 2019. [NCCU undergraduate research.]

D. M. Markoff (for the COHERENT Collaboration), A Ton-Scale NaI Detector to Measure Coherent Neutrino-Nucleus Scattering and the Charged Current Neutrino Interaction on Iodine, 5th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan October 23–27, 2018; Waikoloa, Hawaii, CN.10 (2018).

R.C. Malone, B. Crowe, A. S. Crowell, L.C. Cumberbatch, B.A. Fallin, F.Q.L. Friesen, C.R. Howell, C.R. Malone, D.M. Markoff, D.R. Ticehurst, W. Tornow, H.A. Witala, Neutron-neutron quasifree scattering in neutron-deuteron breakup, 5th Joint Meeting of the APS Division of Nuclear Physics and the Physical Society of Japan October 23–27, 2018; Waikoloa, Hawaii, LC.2 (2018).

D. M. Markoff (for the COHERENT Collaboration), A Ton-Scale NaI Detector for Coherent Neutrino-Nucleus Scattering Studies, XXVIII International Conference on Neutrino Physics and Astrophysics, Neutrino2018 pposter resented Heidelberg, Germany July 2018.

D. M. Markoff (for the COHERENT Collaboration), The COHERENT neutrino-nucleus scattering research program at the ORNL Spallation Neutron Source. APS Division of Nuclear Physics Meeting Pittsburgh, PA October 25-28, 2017.

A. Brown (for the COHERENT Collaboration), Development of Muon Veto System for 185-kg NaI[Tl] Detector. Poster presented at the APS Division of Nuclear Physics Meeting Conference Experience for Undergraduates program, Pittsburgh, PA October 25-28, 2017. (Senior Thesis work under D. Markoff)

S. Hairston (for the COHERENT Collaboration), Simulating the NaI [Tl] Detector for the COHERENT Project. Poster presented at the APS Division of Nuclear Physics Meeting Conference Experience for Undergraduates program, Pittsburgh, PA October 25-28, 2017. (Senior Thesis work under D. Markoff)

Professional Society Memberships

American Physical Society (APS)

American Association of Physics Teachers (AAPT)

Physics Instructional Resource Association (PIRA)

National Society of Black Physicists (NSBP)

Professional Service and Outreach 2017-2024

- Lead organizer for NCCU Science Expo as part of the NC Science Festival during the month of April, 2024. Coordinated faculty, staff and students who presented various science activities for the public.
- APS Committee on Careers and Professional Development (2022-24) Participate in committee meetings and discussions of programs sponsored by the committee. Proposed project: integrate a career program into Division of Nuclear Physics fall meetings.
- APS Program Committee for Division of Nuclear Physics (DNP) 2022-23 Organized invited session for fall 2022 DNP meeting: University-Based Accelerator Programs; co-organized mini-symposia on Physics of Double Beta Decay.
- Member of the TUNL Climate Committee (2021 - present) Members of the committee discuss issues of diversity and inclusion at TUNL. The group is in charge of administering and reviewing periodic surveys, instituting activities to increase community among students, faculty and staff, and reviewing incidences of violations of the TUNL Code of Conduct and any incidents or comments that target any one person or group.
- Member of the International Advisory Committee for Magnificent CEvNS Workshops, (2020-present) Munich, Germany March 2023, Valencia, Spain June 2024, Rio de Janeiro, Brazil June 2025.
- Member of Local Organizing Committee for Neutrinos and Dark Matter (NDM22) May 2022 in Asheville, NC.
- NC SciFest Middle School Scientist Visits (2021-22)
Virtually visited middle school science classes as part of the annual NC Science Festival programs. Presented my research in neutrino physics and showed the students parts of the TUNL laboratory facility.
- Member of Local Organizing Committee for Magnificent CEvNS Workshops
October 2019, Chapel Hill, NC; October 2020, virtual; October 2021, virtual
- Member of the local organizing committee for APS Southeastern Section (SESAPS) responsible for the poster session. October 2019.
- Presentation "How Physics Reveals the Hidden Stories of Paintings", Science Cafe lecture series at the Museum of Natural Sciences, Raleigh, NC, November 2018.
<https://naturalsciences.org/calendar/event/science-cafe-how-physics-reveals-the-hidden-stories-of-paintings/>
- Active member of the American Physical Society (APS) Triangle Local Links Committee. (2016-2018).
Our goal was to organize social events for the purpose of promoting interaction between physics students and researchers in academic institutions with physicists in local industry.

- Leader of the NCCU Telescope Team (a group of 2 faculty, 1 community volunteer and up to 5 students have participated) that collaborates with Durham Parks and Recreation on Outdoor Astronomy programs for the community. We provide NCCU telescopes, students and enthusiasm to promote science and astronomy. (2014 - 2020)
- Co-organizer responsible for faculty and staff volunteers for the annual high-school Science Bowl competition at NC Central University, Durham, NC January 2012 through 2020.
- National Science Foundation proposal reviewer, and served on Nuclear Physics review panels; Department of Energy proposal reviewer.
- Member of the local organizing committee for the NuEclipse Workshop held at the University of Tennessee, Knoxville, TN, August 20-22, 2017.
- Prepared the successful NSF proposal to institute a Research Experience for Undergraduate (REU) program at TUNL in 2000. Developed and directed 2000, 2001 and 2002 REU programs with 10-15 UG students per year. Served on application review committee 2013, 2015, 2016, 2018, 2019.

Research Advisors

Masters thesis research

- S. Prussin, Professor, Deceased, University of California, Berkeley
- A. DeVolpi, Senior Staff Scientist, Retired, Argonne National Laboratory

Doctoral thesis dissertation

- E. Adelberger, Professor, Retired, University of Washington
- B. Heckel, Professor, University of Washington

Post-doctoral research

- D. Haase, Professor, Retired, North Carolina State University
- C. Gould, Professor, Retired, North Carolina State University,