CURRICULUM VITAE

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EDUCATION

Ph.D. December 2015	Department of Physics and Astronomy, Louisiana State University Dissertation title: *"Nuclear Structure of ^{26}Si and ^{32}Cl for Astrophysics"*. Advisor: J. C. Blackmon
M. S. May 2014	Department of Physics and Astronomy, Louisiana State University Master's thesis title *"Study of the Low Energy Neutrino Spectrometer (LENS) concept with a μLENS prototype"*. Advisor: J. C. Blackmon.
B. S. June 2009	Department of Physics and Technology, Kharkiv National University, Kharkiv, Ukraine. Bachelor's thesis title *"Scintillation Gamma–Spectrometer Based on RISC PIC18F452 Microcontroller"* (in Ukrainian). Advisor: S. Stervoyedov.

WORK EXPERIENCE

Start: December 2015	Department of Physics and Astronomy Louisiana State University, USA, temporary research position
Start: August 2017	Noble Gases lab of the McDonnell Center for the Space Sciences at Washington University in St. Louis, USA, research position
Start: February 2021	Institute for Nuclear Research, Lepton Physics Department, Kiev, Ukraine, research position

EXPERIMENTAL EXPERIENCE

- I was working on development of a highly-segmented, liquid-scintillator-based detector prototype instrument (Low Energy Solar Neutrino Spectrometer) for detecting low-energy solar neutrinos. The detector is an indium-loaded liquid scintillator detector with the capability to precisely measure the full spectrum of solar neutrinos, including pp, ^{7}Be, pep, and CNO neutrinos, through the charged current reaction. Detecting solar neutrinos could help to understand the details of the Sun's composition, specifics of nuclear reactions through which the nuclear fusion occurs, the production of energy as well as allowing means to look into the Sun's inner core.
- I participated in all phases of the detector construction including the scintillator-handling system for filling the detector.
- The goal was to achieve low-background gamma-environment for the optimal performance of the detector. I led the collection and analysis of data to determine the detector response to both backgrounds and neutrino signatures, using signal deconvolution to better understand and distinguish background from potential neutrino signals. Ways to reject the unwanted background noise were studies. Work was performed in residence at the Kimballton Underground Research Facility.
- As a result of my work on the liquid scintillator detector I gained a broad experience working with plastic and liquid scintillators, understanding their chemistry, composition and behavior. I was using extensively photoelectric multipliers and the electronics traditionally used in nuclear

physics. I studied their performance, signal response, signal-to-background noise. I was extensively using radioactive and LED calibration sources.

- I performed and participated in a number of experiments studying isotope compositions of stars heavier than the Sun. IN the laboratory, nuclear reactions taking place in binary systems explosions like novae and X-ray bursts were reproduced. In particular, I led study of the excited states in the ^{32}Cl nucleus that are important for understanding the ^{31}S(p,γ)^{32}Cl reaction in X-ray bursts and novae at Argonne National Laboratory, led measurement of the ^{25}Al+p elastic scattering excitation function using an ^{25}Al radioactive ion beam produced by the "in-flight" technique with the RESOLUT facility at Florida State University and participated in a number of experiments using stable and radioactive ion beams at Florida State University, including a study of states in ^{18}Ne that determine the ^{14}O(α,p)^{17}F reaction rate and a direct measurement of the ^{18}Ne(α,p)^{21}Na reaction, both of which are important for understanding X-ray bursts.
- Tracking of ions was performed as well as precise energy measurement and atomic number identification.
- In my experimental work I used a broad range of detectors and instruments including the Argonne FMA and the high-purity germanium detector array Gammasphere, silicon detector arrays, solid-scintillator detector arrays, ionization detectors and multichannel-plate detectors. I participated in the development of a position-sensitive gas ionization detector to measure heavy ions.
- I developed and tested a microchannel plate (MCP) detector for the focal plane of the Argonne Fragment Mass Analyzer (FMA).
- I developed and tested detectors for the Array for Nuclear Astrophysics and Structure with Exotic Nuclei (ANASEN), which was used for these studies, and is one of the major instruments for experiments with low energy radioactive ion beams at FSU and the National Superconducting Cyclotron Laboratory.
- Custom electronics for the ionization detector and the ANASEN array had to be developed for the best signal readout. I participated in developing the electronics, optimizing its performance and filtering out the background in case of very weak detector signals.

- My work towards obtaining the Bachelor of Science degree was done at the Department of Physics and Technology, Kharkiv National University, Kharkiv, Ukraine. As a project for my Bachelor of Science degree I was involved in programming PIC microcontrollers, developing supporting electronics and data analysis software for detecting, analyzing ionization radiation signals from materials samples, and studying material composition of a given sample. Specifically, thin films bombarded by charged ions were explored.
- I participated in setting up the PIC microcontroller to govern initiation of signal acquisition, digitization and preliminary processing of the signals, PMTs high voltage control, and other communication between the data acquisition system and the signal detector. LabVIEW was used to set up I the control panel as well as a multiple-channel wave amplitude analyzer. Activity of the sample, activation energy of the sample and the sample composition were measured.

TEACHING EXPERIENCE

- Graded homework assignments in General Physics for physics majors and held weekly recitation sections at Louisiana State University (LSU).
- Taught Physics 2108/2109, a laboratory class in mechanics and electromagnetism for pre-medical students at LSU. Included a brief lecture period, tests, student supervision and aid during each class period.
- Assisted in teaching a variety of undergraduate physics classes through discussion sections, grading and assisting in laboratory classes (LSU).

PROFESSIONAL AFFILIATIONS & ACTIVITIES

- American Physical Society

CONTRIBUTED TALKS:

- A. Ratkiewicz *et al.*, *"The Particle-Gamma Detector GODDESS"*, 4th Joint Meeting of the Division of Nuclear Physics and the Physical Society of Japan, Waikoloa, Hawaii, October 7–11, 2014.
- L. Afanasieva *et al.*, *"The $^{31}S(p,\gamma)^{32}Cl$ reaction rate in novae"*, 2013 Annual Fall Meeting of the Division of Nuclear Physics, Newport News, VA, October 23–26, 2013.
- P. Chowdhury *et al.*, *"Search for Collective Oblate Structures in ^{186}W"*, Annual Fall Meeting of the Division of Nuclear Physics, Newport News, VA, October 23–26, 2013.
- L. Afanasieva *et al.*, *"Testing the LENS Scintillation Lattice with MicroLENS"*, 2012 Annual Fall Meeting of the Division of Nuclear Physics, Newport Beach, CA, October 24–27, 2012.
- C. M. Deibel *et al.*, *"Radioactive Ion Beam studies of α, p process waiting points in X-Ray Bursts"*, XII International Symposium on Nuclei in the Cosmos, Cairns, Australia, August 5-12, 2012.
- C. M. Deibel *et al.*, *"Studying X-ray Burst Nucleosynthesis in the Laboratory"*, Horizons of Innovative Theories, Experiments, and Supercomputing in Nuclear Physics, HITES, New Orleans, Louisiana, 4-7 June, 2012.
- M. Amrit *et al.*, *"Electronics and Data Acquisition for MiniLENS"*, 2011 Annual Fall Meeting of the Division of Nuclear Physics, East Lansing, MI, October 26–29, 2011.

PROFESSIONAL SKILLS

- Gamma-ray spectroscopy both high-resolution spectroscopy with HPGe and with scintillators combined with PMTs
- Charged-particle detection using a wide variety of techniques, for example with large-area, highly-segmented silicon-strip arrays, microchannel plate detectors, and gas ionization detectors
- Low intensity radioactive ion beam techniques
- Electronics development and testing
- Data analysis and computational experience with MATLAB, LABVIEW, ROOT
- Experience with C++, Fortran programming languages
- CAD experience with Solidworks

PUBLICATIONS

1. J. Lai *et al*., *"Position-sensitive high rate Ionization Chambers for Heavy Ion Detection"*, Nuclear Instrument and Methods in Physics, Research Section A: Accelerators Spectrometers Detectors and Associated Equipment, May 2018.
2. P. Chowdhury *et al*., *"Search for Collective Oblate Structures in 186W"*, APS Division Nuclear Physics Newport News Meeting 2013, October 2013.
3. L. Afanasieva *et al.*, *"Gamma spectroscopy of states in ^{32}Cl relevant for the $^{31}S(p,\gamma)^{32}Cl$ reaction rate"*, , Phys. Rev. C., September 2017.
4. C. M. Deibel *et al.*, *"Studying X-ray Burst Nucleosynthesis in the Laboratory"*, published in Journal of Physics: Conference Series, Volume 403, conference 1, 2012 (http://iopscience.iop.org/1742-6596/403/1/012033), Conference Paper in Journal of Physics Conference Series, December 2012.
5. C. Deibel *et al.*, *"Radioactive Ion Beam studies of α p process waiting points in X-Ray Bursts"*, Proceedings of the XII International Symposium on Nuclei in the Cosmos (NIC XII). August 5-12, 2012. Cairns, Australia. Published online at http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=146, id.44 (n/a 2012)

LANGUAGES

English, Russian, Ukrainian