

Wouter Deconinck

Activity Report, Calendar Year 2017

Major Contributions:

In 2017 the highly anticipated first determination of the weak charge of the proton was released by the Q_{weak} collaboration. In an invited plenary talk at Lepton Photon 2017, Deconinck presented a detailed discussion of the final uncertainty budget. Coincidentally, Deconinck taught the Standard Model course (PHYS772, Spring, new prep). Deconinck included YouTube video lectures to teach a modernized graduate quantum mechanics, a move appreciated by the students (PHYS621, Fall, new prep). Deconinck started serving on the marine science minor advisory board and the university's career development committee, owing to his interests in marine science and engineering.

Scholarly and Professional Activities-Research:

Invited Talks

- Lepton Photon Conference, Guangzhou, China, August 2017
- Electroweak Box Workshop, UMass Amherst, September 2017

Contributed Talks/Posters

- EIC Software Consortium Workshop, Argonne National Lab, October 2017
- "Physics Innovation and Entrepreneurship at a Liberal Arts University," VentureWell OPEN 2017 Conference, Washington, DC

Refereed Papers Published

- *Design and Performance of the Spin Asymmetries of the Nucleon Experiment.* J.D. Maxwell *et al.* [arXiv:1711.09089 [physics.ins-det]]. DOI: 10.1016/j.nima.2017.12.008.
- *Q_{weak} : First Direct Measurement of the Proton's Weak Charge.* D. Androic *et al.* DOI: 10.1051/epjconf/201713708005. EPJ Web Conf. 137 (2017) 08005.
- *Ratios of helicity amplitudes for exclusive ρ -0 electroproduction on transversely polarized protons.* HERMES Collaboration (A. Airapetian *et al.*) [arXiv:1702.00345 [hep-ex]]. DOI: 10.1140/epjc/s10052-017-4899-1. Eur.Phys.J. C77 (2017) no.6, 378.
- *A novel comparison of Møller and Compton electron-beam polarimeters.* J.A. Magee *et al.* [arXiv:1610.06083 [physics.ins-det]]. DOI: 10.1016/j.physletb.2017.01.026. Phys.Lett. B766 (2017) 339-344.
- *First measurement of unpolarized semi-inclusive deep-inelastic scattering cross sections from a He-3 target.* Jefferson Lab Hall A Collaboration (X. Yan *et al.*) [arXiv:1610.02350 [nucl-ex]]. DOI: 10.1103/PhysRevC.95.035209. Phys.Rev. C95 (2017) no.3, 035209.

Unpublished Reports

- *Search for three-nucleon short-range correlations in light nuclei.* Hall A Collaboration (Z. Ye *et al.*) [arXiv:1712.07009 [nucl-ex]].

Grants and Awards

- NSF MPS "Precision Studies of the Standard Model using Parity-Violating Electron Scattering" (as co-PI with PI Armstrong), 08/2017-07/2020, \$610k.
- NSF UISE "Collaborative Research: The PIPELINE Network" (as PI with coPIs Bill Cooke, Graham Henshaw, APS as lead institution with PI Crystal Bailey), 08/2016-07/2019, \$54.8k at W&M.
- NSF MPS "Precision Studies of the Standard Model using Parity-Violating Electron Scattering" (as co-PI with PI Armstrong), 08/2014-07/2017, \$705k.

Teaching:

Courses

- PHYS772 “Standard Model” (Spring 2017):
- PHYS621 “Quantum Mechanics 1” (Fall 2017): Research-inspired modernization of course material through adoption of textbook by LeBellac and YouTube video lectures for formal material in first half of semester, interactive lectures focused on problem solving and using quantum mechanics.

Senior/Honor Theses

- William Laney (Spring 2015-present, *honors*): “SharkDuino: Design, development, and implementation of an animal data-logging tag” (co-supervised with Kevin Weng, VIMS)
- Jacob Gunnarson (Fall 2016-Spring 2017, *honors*): “A search for atmospheric waves in the atmosphere of Venus” (co-supervised with Kunio Sayanagi, HU)
- Jacob McCormick (Fall 2016-Spring 2017): “Simulation of pion detectors for the MOLLER experiment at Jefferson Lab” (co-supervised with David Armstrong)
- Scott Mundy (Spring 2016-present): “Simulation of pion detectors for the MOLLER experiment at Jefferson Lab” (co-supervised with David Armstrong)
- Seamus Herriman (Fall 2017-present): “Development and Testing of a Curriculum for an Introductory Course for MakerSpace in High School”
- Dara Kharabi (Spring 2017-present): “SharkDuino: Analysis, visualization, and interpretation of accelerometer data from captive sharks at VIMS” (with Kevin Weng)

Summer Research Students (stipend)

- (Austin Milby, as listed below)

Undergraduate Research Students (for credit)

- John Almeter (Spring 2017): “Upper limits on Lorentz-violating parameters in the Standard Model Extension based on Qweak data at Jefferson Lab”
- Jarod Worden (Fall 2017-present): “Beam-dump backplash background in the MOLLER experiment at Jefferson Lab”
- Quinton Olson (Fall 2017-present): “Development of an FPGA-based helicity-decoding PCB board for Jefferson Lab”
- Jon Silberstein (Fall 2017-present): “Simulations of nuclear targets in the P2/MESA experiment at the University of Mainz”
- Abby Bilenkin (Fall 2017-present): “SharkDuino: Firmware code hardening and machine learning” (with Kevin Weng)
- Hanqiu Peng (Fall 2017-present): “SharkDuino: Analysis of accelerometer data from captive sharks at VIMS” (with Kevin Weng)

Undergraduate Research Students (hourly)

- Austin Milby (Summer 2017-Fall 2017): “Development of the firmware for an FPGA-based helicity-decoding board for Jefferson Lab”
- Erik Stevenson (Fall 2017-present): “Containerization of Jefferson Lab simulation software using Docker and Singularity”

Graduate Students

- Kurtis Bartlett (Summer 2012-present): “Simulation of Moller scattering in the Qweak experiment using Geant4 and analysis of parity-conserving transversely polarized Carbon and Aluminum elastic scattering” (anticipated graduation Spring 2018)

Post Docs

- (none)

Service:

Department

- Fall 2010-Spring 2017: Graduate admissions committee
- Fall 2013-present: Small Hall MakerSpace coordinator with Josh Erlich.
- Fall 2017-present: Facilities Committee
- Annual review committee: AJ Pyle, Kyle Eskridge, Andrew Hurley, Victoria Owen (and my own graduate students)

University

- Fall 2016-present: TribeSat, W&M's first satellite, coordinator with Josh Erlich.
- Fall 2017-present: Career Development Committee
- Fall 2017-present: Marine Science Minor Advisory board
- Fall 2017-present: VIMS Industry Partnership Forum
 - Presentation: "Sharkduino", August 25, 2017
- Fall 2017-present: BioMath seminar
 - Presentation: "Sharkduino", November 10, 2017
- W&M TribeHacks 2017 faculty adviser and competition judge
- Student club adviser: W&M Astronomy Club, W&M oSTEM Chapter
- Invited speaker host: Wes Gohn ("New muon g-2," Fall 2017)

Physics Community

- Spring 2016-present: Virginia Space Grant Consortium, SmallSat Working Group
 - Agile CubeSat Workshop, November 11, 2017, UVA.
- Fall 2017-present: "Digital Disruption in Hampton Roads" group (founder)
 - Design thinking session with Anthem, Berkana, NASA LaRC, HU, W&M, November 17, 2017, at W&M.
- CoPI on Jefferson Science Associates Initiatives Fund "Promising Young Physicist" project: selection of JLab postdocs for mock job interviews, including review and feedback on job application dossiers and presentations.
- APS DNP National Nuclear Physics Summer School Steering Committee (2016: vice chair, 2017: chair)

Public Outreach