

Nicholas J. Harmon

CONTACT

INFORMATION

Department of Physics and Engineering Science
Coastal Carolina University
Smith Science Center 123E
109 Chanticleer Drive East
Conway, SC 29526

Tel: (843) 349-4072
E-mail: nharmon@coastal.edu
Webpage:
<https://ww2.coastal.edu/nharmon/>

EDUCATION

The Ohio State University, Columbus, OH

Ph.D, Department of Physics (graduation date: December 12, 2010)

- Area of Study: Condensed Matter Physics (theory)

The College of Wooster, Wooster, Ohio

B.A., Physics and Mathematics; Minor, Philosophy; **Magna Cum Laude**
May 2004

- Area of Study: Nonlinear Dynamics

RECENT

TEACHING

EXPERIENCE

Coastal Carolina University, Conway, SC

- **Assistant Professor**

- Physics 399, Introduction to Quantum Information, Spring 2023 (3 students)
- Physics 399, Physics of Magnetic Resonance, Spring 2023 (1 student)
- Physics 399, Research, Spring 2023 (1 student)
- Physics/Engineering 250, Communicating STEM, Spring 2023 (25 students)
- Physics 211; Essential of Physics I, Spring 2023 (backup role) (42 students)
- Physics 211; Essential of Physics I, Spring 2023 (40 students)

- Physics 499, Physics Capstone, Fall 2022 (1 student)
- Physics 351, Computational Methods for Physicists and Engineers, Fall 2022 (13 students)
- Physics 211; Essential of Physics I, Fall 2022 (backup role) (40 students)
- Physics 211; Essential of Physics I, Fall 2022 (35 students)

- Physics 499, Physics Capstone, Spring 2022 (1 student)
- Physics/Engineering 250, Communicating STEM, Spring 2022 (17 students)
- Physics 211; Essential of Physics I, Spring 2022 (29 students)
- Physics 211; Essential of Physics I, Fall 2022 (two sections totaling about 80 students)

RECENT RESEARCH MENTORING EXPERIENCE

- Supervised senior student modeling spin and charge dynamics in magnetic field gradients, Coastal Carolina University, Summer 2022 - present
- Supervised junior student modeling spin and charge dynamics in magnetic field gradients, Coastal Carolina University, Spring 2022, Spring 2023
- Supervised senior student modeling spin and charge dynamics in magnetic field gradients, Coastal Carolina University, Fall 2021 - Spring 2022

RECENT GRANTS AND AWARDS

Internal (Coastal Carolina University)

- Faculty Summer Research Award
- Title: A Quantum Approach to Magnetic Field Sensing
- \$5,250 in summer 2022

External - single PI on the RUI NSF grant

- Investigating Spin Currents from Nuclear Field Gradients
- awarded January 2021
- \$116,739 over 3 years

RECENT SERVICE AND OUTREACH

Journal Referee

- regular referee for a variety of journals: Phys. Rev. Lett., Phys. Rev. X, Phys. Rev. Applied, Phys. Rev. B, Appl. Phys. Lett., J. of Appl. Phys., J. of Mat. Chem. C, Organic Electronics

Other Service and Outreach

- Society of Physics Students faculty advisor at the University of Evansville (Fall 2019 to Spring 2021)
- Organizing outside speaker in the data science industry for the CiSM certificate

RESEARCH INTERESTS

Condensed Matter Theory, focusing on fundamental physics and applied physics of spin in both inorganic and organic materials; using analytic and computational methods to explore new technologies that utilize spin.

BOOK CHAPTER

“Room-Temperature Quantum Coherence in Emission from Organic Semiconductors”, **Nicholas J. Harmon** and M. E. Flatté. Chapter 4 of Volume 3: Magnetic Field Effects in World Scientific Reference on Spin in Organics: pp. 143-188

JOURNAL PUBLICATIONS

Italicized names denote undergraduate authors.

Submitted:

6. **Nicholas J. Harmon**, J. P. Ashton, P. M. Lenahan, and M. E. Flatté, *Near-Zero-Field Spin-Dependent Recombination Current and Electrically Detected Magnetic Resonance from the Si/SiO₂ interface*, submitted to Applied Physics Materials (find preprint at <https://arxiv.org/abs/2008.08121>)

Published:

5. E. B. Frantz, **Nicholas J. Harmon**, D. J. Michalak, E. M. Henry, M. E. Flatté, S. W. King, J. S. Clarke, and P. M. Lenahan, *Extraction of*

dipolar coupling constants from low-frequency electrically detected magnetic resonance and near-zero field magnetoresistance spectra via least squares fitting to models developed from the stochastic quantum Liouville equation, J. Appl. Phys. **130**, 234401 (2021).

4. **Nicholas J. Harmon** and M. E. Flatté, *Theory of oblique-field magnetoresistance from spin centers in three-terminal spintronic devices*, Phys. Rev. B **103**, 035310 (2021).
3. Y. Wang, K. Sahin-Tiras, **Nicholas J. Harmon**, M. Wohlgenannt, and M. E. Flatté, *Immense magnetic response of exciplex light emission from correlated spin-charge dynamics*, Phys. Rev. X **6**, 011011 (2016)
2. H. Inoue, A. G. Swartz, **Nicholas J. Harmon**, T. Tachikawa, Y. Hikita, M. E. Flatté, and H. Y. Hwang, *Origin of the magnetoresistance in oxide tunnel junctions determined through electric polarization control of the interface*, Phys. Rev. X **5**, 041023 (2015)
1. F. Macià, F. Wang, **Nicholas J. Harmon**, A. D. Kent, M. Wohlgenannt, and M. E. Flatté, *Organic Magneto-electroluminescence for Room Temperature Transduction between Magnetic and Optical Information*, Nature Communications **5**, 3609 (2014).

RECENT PRESENTATIONS

Invited Talks

Theory of oblique-field magnetoresistance from spin centers in three-terminal spintronic devices. March 15, 2021, APS March Meeting, online conference.

Magnetoresistance Measurements as an Alternative to Magnetic Resonance Methods for Studying Paramagnetic Defects. March 5, 2020, APS March Meeting, Denver, CO. **Conference cancelled due to pandemic. Slides posted on APS March Meeting website**

Contributed Talks

Effects of Nuclear Field Gradients on Spin Transport. March 18, 2022, American Physical Society (APS) March Meeting, Chicago, IL,

Theory and All-Electrical Detection of Spin-Coherent Trap Dynamics at the Si/SiO₂ Interface. December 6, 2021, Materials Research Society (MRS) Fall Meeting, Boston, MA. Presented virtually.

PATENTS

Organic Magneto-electroluminescence for Transduction between Magnetic and Optical Information, filed August 25, 2015

- Inventors: M. Wohlgenannt, M. E. Flatté, A. D. Kent, F. Wang, **Nicholas J. Harmon**, F. Macià. Patent No. 9865660. Assignee: University of Iowa Research Foundation Filed: August 25, 2015. Date of Patent: January 9, 2018