

TODD KOZLOWSKI PH.D.

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RESEARCH APPPOINTMENTS

Deutsches Elektronen-Synchrotron DESY
Postdoctoral Fellow in Experimental Physics

Hamburg, Germany
since 2023

Department of Physics, University of Florida
Graduate Research Assistant

Gainesville, USA
2016-2023

EDUCATION

University of Florida
Ph.D. in Physics

Gainesville, USA
2022

- Advisor: Prof. Guido Mueller
- Dissertation: “Characterization and Control of Optical Cavities Towards a First Science Run in the ALPS II Experiment”

University of Florida
B.Sc. in Physics
B.Sc. in Astronomy
B.A. in Mathematics

Gainesville, USA
2015

RESEARCH FOCUS

Optics and Controls Development for the ALPS II Experiment

since 2018

- Commissioning and characterization of low-loss, long-baseline optical cavities, including a 123-m Fabry-Perot resonator with world-record light storage time.
- Development and implementation of an ultra-weak signal detection scheme using heterodyne interferometry requiring extreme phase stability.
- Design and implementation of precision analog and digital laser frequency stabilization techniques.

Application of Laser Interferometry to Fundamental Physics

since 2021

- Design and evaluation of an experiment to measure the vacuum magnetic birefringence with the ALPS II optics and infrastructure.
- Development of novel applications of long-baseline optical resonators as a direct search for dark matter and physics beyond the standard model.

TEACHING AND MENTORING

Deutsches Elektronen-Synchrotron DESY

- Supervised in total 6 undergraduate students on short-term research projects in optical interferometry and precision metrology. 2019, since 2023

Department of Physics, University of Florida

- PHY4802L Laboratory Physics I 2016-2017

– Teaching assistant for a hands-on laboratory electronics course for 30-40 undergraduate physics, astronomy, and engineering students.

- PHY2049 Physics 2 with Calculus 2015

– Discussion section teaching assistant for 120 engineering and physics students.

- PHY1033C Discovering Physics with Lab 2014

– Teaching assistant for pilot hybrid course for non-science majors.

PUBLICATIONS Refereed Journal Articles

1. T. Kozlowski, L.-W. Wei, A.D. Spector, A. Hallal, H. Frädrich, D. Brotherton, I. Oceano, A. Ejlli, H. Hollis, K. Karan, G. Mueller, D.B. Tanner, B. Willke and A. Lindner. “Design and performance of the ALPS II regeneration cavity”. *Opt. Express* 33, 11153-11166 (2025)
2. A.D. Spector and T. Kozlowski, “Optical cavity characterization with a mode-matched heterodyne sensing scheme”. *Opt. Express* 32, 27112-27124 (2024)
3. M. Diaz Ortiz, J. Gleason, H. Grote, A. Hallal, M.T. Hartman, H. Hollis, K.-S. Isleif, A. James, K. Karan, T. Kozlowski, A. Lindner, G. Messineo, G. Mueller, J.H. Pöld, R.C.G. Smith, A.D. Spector, D.B. Tanner, L.-W. Wei, B. Willke. “Design of the ALPS II optical system”. *Physics of the Dark Universe* 35 (2022)

Journal Articles in Preparation

1. A.D. Spector, T. Kozlowski, L. Roberts. “Demonstration of an interferometric technique for measuring vacuum magnetic birefringence with an optical cavity”. ArXiv preprint, <https://arxiv.org/abs/2510.14064>
2. T. Kozlowski. “Absolute length sensing in a long-baseline high-finesse optical cavity”.
3. A.D. Spector, D. Brotherton, A. Hallal, H. Frädrich, J. Egge, L.-W. Wei, T. Kozlowski, K. Karan, K.-S. Isleif, H. Grote, H. Hollis, G. Mueller, D.B. Tanner, B. Willke and A. Lindner. “Data analysis for the ALPS II first science campaign”.
4. The ALPS Collaboration. “Any Light Particle Search II: first science results”. Prepared for submission to Physics Review Letters.

PRESENTATIONS Invited Presentations

1. “Light Dark Matter Searches at DESY,” lecture, IMPRS Graduate Lecture Week, 2024
2. “Characterizing Low-loss Optical Cavities,” Seminar on Applied Optical Technology and GW Detection (Hamburg), 2024
3. “Axion Searches at DESY,” Cosmic WISPer Meeting (Bari), 2023
4. “ALPS II Initial Science Run,” Invisibles ’23 (Göttingen), 2023
5. “ALPS II Status and Potential for VMB@ALPS,” PBC Technology WG Meeting at CERN (online), 2023
6. “Light-shining-through-a-Wall Experiments,” lecture, IMPRS Graduate Lecture Week, 2023
7. “Status of the ALPS II Experiment,” report for the 92nd Meeting of the DESY PRC, 2021

Contributed Presentations

1. “Towards a Measurement of Vacuum Magnetic Birefringence with ALPS II,” 20th Patras Workshop (Tenerife), 2025
2. “Optical Interferometry and Control,” Helmholtz Meeting on Optics, Photonics, and Lasers (Hamburg), 2024
3. “Characterization of Optical Systems in the ALPS II Experiment,” DPG Spring meeting (Hannover), 2023
4. “VMB@ALPS,” ALPS II Collaboration Meeting (Hamburg), 2023
5. “Precision Optical Techniques in the ALPS II Experiment,” DPG Spring meeting (Erlangen), 2022
6. “Status of the ALPS II Experiment,” Quantum Universe Day (Hamburg), 2022
7. “Optical Design of the ALPS II Experiment,” DPG Spring meeting (Dortmund), 2021
8. “Heterodyne Detection in ALPS II,” Giuseppe Messineo, Ayman Hallal, Todd Kozlowski, D. B. Tanner, Guido Mueller, 15th Patras Workshop (Freiburg), 2019
9. “Control and Alignment in the ALPS II Experiment,” DPG Spring meeting (Aachen), 2019

INTERNSHIPS

Undergraduate Research Intern <i>Max Planck Institute for Gravitational Physics</i>	Hannover, Germany
Web Development Intern <i>Space Dolphin Labs</i>	Summer 2017 Gainesville, USA
Naval Research Enterprise Internship <i>Naval Research Laboratory</i>	Summer 2016 Washington, D.C., USA
	Summer 2015

AWARDS

- **DESY-Fellowship** in Experimental Particle Physics 2022
- **Excellence in Research Award**, University of Florida Department of Physics 2021

AND HONORS

SKILLS

Languages: English (native), German (intermediate)

Programming: Data processing and analysis (Python, MATLAB), automation and controls (Python), web development (Javascript, Ruby, Python)

ACADEMIC
SERVICE

- Invited Referee, *Physics Letters B* since 2025
- Representative, DESY-FH Early Career Science Board since 2024
 - Chair of the Board (since 2025)
- Editor, *Proceedings of the 14th Patras Workshop on Axions, WIMPs, and WISPs* 2019
- Memberships:
 - German Physical Society (DPG) since 2019
 - LIGO Scientific Collaboration (LSC) since 2025
 - Einstein Telescope Collaboration (ET) since 2025