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Damien M. E. Koon

Research Interests: Theoretical physics; quantum gravity; holography (AdS/CFT); conformal field theory; quantum information in QFT

Education

May 2027 **B.S. in Physics**, *Florida Institute of Technology*, Melbourne, FL, **GPA: 4.00/4.00**

May 2024 **A.S. in Physics**, *Mississippi Gulf Coast Community College*, Gulfport, MS

May 2022 **A.A.S. in Cyber Security**, *Mississippi Gulf Coast Community College*, Gulfport, MS

Research Experience

Jan 2025–Nov 2025 **Quantum Computing - CHSH Experiment Honors Project**, *Florida Institute of Technology*, Melbourne, FL, Supervisor: Dr. Souvik Das

- Independently studied quantum information theory: Entanglement, Bell inequalities, and Nonlocal Correlations.
- Developed and built interactive qubit visualization models (Hadamard-gate axis rotations and spinor representations) to illustrate $SU(2)$ structure.
- Implemented three CHSH inequality violation methods: two simulated, one on IBM Quantum hardware and statistically validated results.
- Drafted a research manuscript and delivered a three-lecture series including derivations of Tsirelson's bound and Bell's inequality.
- Presented internal research seminars; full manuscript and reproducible codebase available at: https://github.com/acroscopic/CHSH.

Sep 2024–Present **Gamma-Ray Burst Afterglows**, Florida Institute of Technology, Melbourne, FL, Supervisor: Dr. Donald Warren

- Conducted sustained undergraduate research, including full-time Research Assistant internship (May–Aug 2025).
- Designed and streamlined computational infrastructure for Slurm-based HPC clusters; Implemented version control practices and modernized GitHub documentation.
- Converted high-data HPC simulation outputs into HDF5, reducing storage by ∼85%, improving I/O performance.
- Developed Python tools for performance diagnostics, error detection, and 7-dimensional parameter-space exploration.
- Presented methodology and results to an international research audience at the ASROC 2025 conference in Taiwan
- Synthesized current literature and translated semi-analytic afterglow models into numerical simulations.
- Generated large-scale training datasets across 7-dimensional parameter spaces for a neural network.
- Manuscript in preparation.

Work Experience

Sep 2024–Present **Ortega Observatory Assistant**, *Florida Institute of Technology*, Melbourne, FL

- Designed, proposed, and led observational astronomy activities for students and community groups across campus and external venues including local schools and the Kennedy Space Center Visitor Complex.
- Set up, maintained, and instructed use of a wide range of telescopes including manual and motorized telescopes of different types and sizes; executed polar and multi-star alignment.
- Communicated complex astronomical concepts clearly to large public audiences (up to ∼1,000 participants).
- Project manager of the Observatory's History of Astrophotography collection and led the Art Conservation and 3D printing accessibility programs.
- Key events: Florida Tech STEM Power Day and Discovery Day, Kennedy Under the Stars (Kennedy Space Center Visitor Complex), West Melbourne School of Science events.

Dec 2022–May 2024 **Museum Host**, *INFINITY Science Center*, Pearlington, MS

- Curated and presented STEM exhibits and demonstrations to diverse audiences.
- Operated scientific equipment (3D printers, Van de Graaff, Tesla coil).
- Founded and maintained the museum library; coordinated educational tours for groups between 2 and 50 people.
- Collaborated with Apollo 13 astronaut Fred Haise on public engagements and archival projects.
- Organized donor engagement for archival and autograph correspondence.

Presentations and Teaching Experience

February 2026 **On the Electrodynamics of Moving Bodies (Einstein, 1905)**, Society of Physics Students (SPS) Journal Club, Florida Institute of Technology.

December 2025 **"Rotations in Algebra and Physics: Orthogonal and Unitary Groups"**, Abstract Algebra Presentation, Florida Institute of Technology. Notes

October 2025 **Can Quantum-Mechanical Description of Physical Reality Be Considered Complete? (Einstein, Podolsky, Rosen, 1935)**, SPS Journal Club, Florida Institute of Technology. Slides

September 2025 **Introductory LaTeX Workshop**, Society of Physics Students (SPS), Department of Mathematics & Department of Physics and Space Sciences, Florida Institute of Technology, Slides

May 2025 **"Neural Networks for Parameter Estimation of Orphan Afterglows"**, ASROC Annual Meeting, National Formosa University, Taiwan. Slides.

Apr 2025 **CHSH Inequality Lecture Series (3 lectures)**, Florida Institute of Technology; Poster at SPSCon 2025. Writeup, Code, Poster Abstract Book

Relevant Coursework

Physics: General Relativity, Subatomic Physics, Quantum Computing; Quantum Mechanics; Statistical Mechanics; Electricity & Magnetism; Classical Mechanics.

Mathematics: Manifolds, Real Analysis, Complex Analysis, Point-set Topology, Abstract Algebra; ODE/PDE; Linear Algebra.

Extracurriculars & Leadership

Aug 2024–August 2025 **Society of Physics Students**, *President/Treasurer*, Florida Institute of Technology
- Secured ∼$10k funding for conference travel
- Organized Sigma Pi Sigma Induction ceremony
- Ran an introductory LaTeX workshop

2023–2024 **Phi Theta Kappa**, *Vice President of Scholarship*, Mississippi Gulf Coast Community College
- Honors in Action Project Head; Led research on the Mississippi Gulf Coast seawall.
- Synthesized research and authored a children's book; distributed to county libraries and elementary schools.

2020–2024 **STEM Club President; American Sign Language Organization President**, *Mississippi Gulf Coast Community College*

Skills

Python; Bash; Git; Mathematica; HPC (Slurm, Linux); HDF5; NumPy/Pandas/Matplotlib; Qiskit/IBM Quantum; LaTeX; Web development (HTML/CSS); Zotero;

Awards & Honors

2025 Outstanding Student of the Year; Florida Tech Honors College

2024 MGCCC Honors College, Citizenship Award, Student Hall of Fame

2024 Phi Theta Kappa Alumni; Excellence in Leadership Award

Memberships

Sigma Pi Sigma – Inducted April 2025

American Physical Society – Student Member

American Astronautical Society – Student Member

Phi Theta Kappa – Inducted January 2025

American Radio Relay League – HAM Radio Technician