Adrian D. Scheppe

Air Force Institute of Technology
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Research Interests

Primarily interested in all things related to condensed matter and quantum computation (QC) with a focus on topological states and topological QC. Currently working on modelling Superconductor | Topological Insulator heterostructures, Majorana states, and applications to QC. Additional work includes quantum optical system theory and applications to QC.

Education

Air Force Institute of Technology — Dayton, OH
Ph.D. *in* ***Physics*** — *expected Sept 2023*
Advisor: Michael Pak

Air Force Institute of Technology — Dayton, OH
Master of Science *in* ***Applied Physics*** — *Mar 2021*
Advisor: Michael Pak

US Air Force Academy — Colorado Springs, CO
Bachelor of Science *in* ***Physics*** — *May 2019*
Concentration in Mathematical Physics
Minor in German

Research Experience

Graduate Student Researcher, *Advisor: Michael Pak* — August 2019 – Present
Air Force Institute of Technology — *Dayton, OH*
- SC—TI heterosctructure and Majorana modelling for robust qubit designs
- Theoretical modelling of PDC entangled photon systems

Student Researcher, *Advisor: Francis Chun* — Aug 2018–May 2019
Center for Space Situational Awareness (CSSAR) — *Colorado Springs, CO*
- Collected observational data of known satellites and successfully identified via recorded polarization data

Student Research Intern, *Advisor: Selim Elhadj* — May 2017–July 2017
Lawrence Livermore National Laboratory — *Livermore, CA*
- Assisted with the assembly and maintenance of atomic layer deposition system and collected sample data

AWARDS, GRANTS, & HONORS

Advanced Academic Degree (AAD) Program	Mar 2021
Applied Physics Top Student Award	May 2019
Graduate School Program (GSP) Scholarship	Nov 2018
CSRP Outstanding Research Finalist	Oct 2017
Cadet Summer Research Program (CSRP) Internship	Jan 2017
US Air Force Academy Appointment	June 2015
President's List (4.0 GPA) at Georgia Highlands Community College	Jan 2014-May 2015
Congressional Nomination to USAFA	Oct 2014
Congressional Nomination to USAFA	Oct 2013
Congressional Nomination to USAFA	Oct 2012
Tellus Museum Outstanding Volunteer Award	Aug 2012

Presentations

Ingredients of a Topological Quantum Computer, *Quantum Information Seminar*, Air Force Institute of Technology/ Air Force Research Lab, Dayton, OH, Feb 2021

Braiding Group for Majorana, *Quantum Information Seminar*, Air Force Institute of Technology/ Air Force Research Lab, Dayton, OH, Nov 2020

Characterization of Unresolved Satellite Imagery Using Polarization Data, *2019 Annual Meeting of the APS Four Corners Section*, CSSAR, Prescott, AZ, Oct 2019

Characterization of Unresolved Satellite Imagery Using Polarization Data, *CORONA*, CSSAR, Colorado Springs, CO, Mar 2019

Publications

4 total; 1 first author

1. Deluca, B., Guererro, N., **Scheppe, A.**, et. al., "Approximation Error in Detection of PDC Source Photons", *Physics Review A*, 2021, *Manuscript*
2. **Scheppe, A.**, Pak, M., "Complete description of fault tolerant quantum gate operations for topological Majorana qubit systems", *Physics Review A*, 2021, *Submitted*
3. Pirozzoli, M. F., Zimmerman, L. A., Korta, M., **Scheppe, A.D.**, et. al."Calibration, Sensitivity Analysis, and Demonstration of a Basic Polarimeter for Artificial Satellite Observations", *Advances in Space Research*, 2021,
4. Miller, J., Gillespie, C., Chesser, J., **Scheppe, A.**, et. al., "Surface modification of organic powders for enhanced rheology via atomic layer deposition", *Advanced Powder Technology*, Volume 31, Issue 6, 2020

Employment

Physicist | *U.S. Air Force* — May 2019 – Present
- Conduct and manage programs and projects
- Support highly technical operations and intelligence
- DoD Interest Research

Server | *Schroeder's New Deli* — July 2014 – May 2015
- Served tables

Server & Cashier | *Steak n' Shake* — Jan 2014 – July 2014
- Served Tables
- Managed Cash Register

Outreach & Service

Construction Volunteer | *Habitat for Humanity, Dayton, OH* — Aug 21 2021
Hung dry wall at 233 W. Pease Ave. Build Site for 7 hrs

Physics & Math Tutor | *USAFA Tutor Program, Colorado Springs, CO* — August 2016–May 2019
Provided free undergraduate Physics tutoring to peers 2 hrs/week through official tutoring program

Math Tutor | *AfterMath, Monument, CO* — August 2017–May 2019
Provided free Math (and occasionally Physics) tutoring to K-12 for 3 hrs/week

Squadron Academics Officer | *USAFA, Colorado Springs, CO* — Aug 2018–May 2019
Provided continual academics related resources and assistance to over 100 students
Provided special assistance to at risk GPA students so that they were not disenrolled

Squadron Volunteering Coordinator | *USAFA, Colorado Springs, CO* August 2017–May 2018

Planned and coordinated two major volunteering efforts for over 100 cadets

Colorado Springs Fire Department Fire Safety Awareness

Manitou Springs Nature Trail restoration project

Area Expert | *Tellus Science Museum, Cartersville, GA* August 2013–May 2015

Volunteered for approx. 6 hours/ month engaging general public in hands on natural science exhibits (Solar House, Fossil Dig, Planetarium Shows, Observatory)

Computational Skills

- Arduino & Raspberry Pi
- Python
- MATLAB
- LaTeX

Scholarly Memberships

Eta Kappa Nu	Member
Tau Beta Pi	Member
Phi Theta Kappa	Member