


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

Ph.D. in Physics

Advisor: Michael Pak

Dayton, OH

expected Sept 2023

Air Force Institute of Technology

Master of Science in Applied Physics

Advisor: Michael Pak

Dayton, OH

Mar 2021

US Air Force Academy

Bachelor of Science in Physics

Concentration in Mathematical Physics

Minor in German

Colorado Springs, CO

May 2019

RESEARCH EXPERIENCE

Graduate Student Researcher, Advisor: Michael Pak

Air Force Institute of Technology

August 2019 – Present

Dayton, OH

- SC—TI heterostructure and Majorana modelling for robust qubit designs
- Theoretical modelling of PDC entangled photon systems

Student Researcher, Advisor: Francis Chun

Center for Space Situational Awareness (CSSAR)

Aug 2018–May 2019

Colorado Springs, CO

- Collected observational data of known satellites and successfully identified via recorded polarization data

Student Research Intern, Advisor: Selim Elhadj

Lawrence Livermore National Laboratory

May 2017–July 2017

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

3 total; 1 first author

1. Deluca, B., Guerro, 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., Chessier, 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 <i>U.S. Air Force</i> <ul style="list-style-type: none">□ Conduct and manage programs and projects□ Support highly technical operations and intelligence□ DoD Interest Research	May 2019 – Present
Server <i>Schroeder's New Deli</i> <ul style="list-style-type: none">□ Served tables	July 2014 – May 2015
Server & Cashier <i>Steak n' Shake</i> <ul style="list-style-type: none">□ Served Tables□ Managed Cash Register	Jan 2014 – July 2014

OUTREACH & SERVICE

Construction Volunteer <i>Habitat for Humanity, Dayton, OH</i> <i>Hung dry wall at 233 W. Pease Ave. Build Site for 7 hrs</i>	Aug 21 2021
Physics & Math Tutor <i>USAFA Tutor Program, Colorado Springs, CO</i> <i>Provided free undergraduate Physics tutoring to peers 2 hrs/week through official tutoring program</i>	August 2016–May 2019
Math Tutor <i>AfterMath, Monument, CO</i> <i>Provided free Math (and occasionally Physics) tutoring to K-12 for 3 hrs/week</i>	August 2017–May 2019
Squadron Academics Officer <i>USAFA, Colorado Springs, CO</i> <i>Provided continual academics related resources and assistance to over 100 students</i> <i>Provided special assistance to at risk GPA students so that they were not disenrolled</i>	Aug 2018–May 2019

Squadron Volunteering Coordinator | *USAFA, Colorado Springs, CO*
Planned and coordinated two major volunteering efforts for over 100 cadets
Colorado Springs Fire Department Fire Safety Awareness
Manitou Springs Nature Trail restoration project

August 2017–May 2018

Area Expert | *Tellus Science Museum, Cartersville, GA*
Volunteered for approx. 6 hours/ month engaging general public in hands on natural
science exhibits (Solar House, Fossil Dig, Planetarium Shows, Observatory)

August 2013–May 2015

COMPUTATIONAL SKILLS

- Arduino & Raspberry Pi
- Python
- MATLAB
- L^AT_EX

SCHOLARLY MEMBERSHIPS

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