

ALI O. COX

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EDUCATION

University of Arizona, Physics PhD Expected May 2024 | 3.31GPA

Reed College, Physics B.A. May 2018 | 3.46 Cumulative GPA

Adana Anatolian High School, May 2014

RESEARCH EXPERIENCE

Quantum Optics Research Assistant Summer 2019-present – University of Arizona

- Designed and analyzed the performance of an entanglement-assisted barcode reader, obtaining an upper bound for the Chernoff exponent for discriminating among arbitrary objects.
- Redesigned a sum-frequency generation-based entanglement-assisted joint-detection transceiver, improving its performance to approach the ultimate entanglement-assisted capacity (<https://arxiv.org/abs/2208.07979>)
- Applied group representation theory to find optimal POVM for attaining the superadditive channel capacity of a two-symbol codebook.

Summer Intern at Murch Lab Summer 2018 – Washington University

- Simulated state trajectories of a superconducting cavity qubit to determine its most likely path under continuous partial measurement.
- Worked alongside experimentalist PhD students and learned about principles of circuit QED and how to interpret and interact with readings from electronics in a cryogenic environment.
- Attended weekly journal meetings, getting exposed to the frontiers of fundamental research on quantum measurement and coherent control.

Senior Thesis 2018-2019 Academic year – Reed College

- Proposed a new sail design for single-hull sail boats and optimized its parameters using computational fluid dynamics.

Independent Advanced Lab Projects Spring 2017 – Reed College

- Performed absorption and emission spectroscopy on CdSe quantum dots to characterize their size and compare with the theoretical prediction of the spherical well model and found the Stokes shift between the center frequency of absorption and emission peaks.
- Optically probed the band-gap structure of GaAs and Silicon semiconductor samples, determining the gap energy, and Urbach slope of the band tails.

Undergraduate Summer Research (REU) Summer 2016 – Kansas State University

- Analyzed Raman Scattering characteristics of ZBLAN fiber optic cable.
- Numerically simulated non-linear pulse propagation in ZBLAN fiber.
- Gave weekly talks on research progress.

Programing Languages: LabVIEW, Mathematica, Python, JavaScript, HTML, Matlab

Languages: Turkish (Proficient), Japanese (Intermediate), French (Intermediate)