Amir Shapour Mohammadi

Email: amirsm@princeton.edu
GitHub: https://github.com/amirsm02 Phone: (559) 308-3930

Education

Undergraduate - Princeton University, B.A. Physics 2024

Minors: Applied and Computational Mathematics, Engineering Physics, Near Eastern Language & Culture (Persian)
Clubs/Societies: Society of Physics Students (Mentorship Chair), Princeton Students in Quantum (Connections Coordinator), American Physical Society, Math Club

- *Physics:* Condensed Matter Physics, Low-dimensional Quantum Devices, Quantum Information Theory, Thermal Physics, Statistical Mechanics, Dynamical Systems, Electrodynamics, Quantum Field Theory, Phase Transitions
- *Mathematics:* Abstract Algebra, Linear Algebra, Real and Complex Analysis, Topology, Differential Geometry

Experience

HRL Laboratories, LLC (Malibu, CA) Full-time; May 2023 – August 2023

Adviser: Andrew Oriani
Description:

- Design new electrical control systems for manipulation and readout of quantum dot spin-qubits.
- Evaluate FPGA for RF and baseband pulse generation and readout necessary for full control of spin-qubits.

Yazdani Research Lab (Princeton, NJ) Part-time; February 2023 – present

Adviser: Ali Yazdani and Duncan Haldane, Professors, Physics
Group objective: Understand novel quantum phases of matter using scanning tunnelling spectroscopy.
Description:

- Develop Python simulations to understand experimental signatures of fractional quantum Hall phases in bilayer graphene; results are under review in *Science*.

Petta Research Lab (Princeton, NJ) *Part-time and full-time; May 2021 - present

Adviser: Jason Petta, Professor, Physics
Group objective: Control of semiconductor quantum dots to facilitate high-fidelity manipulations.
Description:

- Develop experimental techniques for high-performance data acquisition and threshold-detection of qubit readout using digitizer and FPGA.
- Extensive experience writing instrument drivers and interfacing with devices using WaveMetrics proprietary language Igor PRO. Coded additional tools in C.
- Develop Python simulation for modelling spin qubits hosted in quantum dots.

Technical Skills

Coding: Experience using Python, MATLAB, Wolfram Mathematica, Qiskit, MATCONT for physics simulations. Extensive experience writing instrument drivers in Igor and C. Professional experience with using Git, LaTeX.
Laboratory Equipment: Extensive experience using electrical equipment for pulse generation and readout including vector network analyzer, oscilloscope, spectrum analyzer, sampling module, FPGA, AWG, digitizer.

Publications

High-Resolution Tunneling Spectroscopy of Fractional Quantum Hall States *ArXiv*, under review in *Science*
Sources of Dephasing in Si/SiGe Quantum Dots To be posted on *ArXiv*

Presentations

Sources of Dephasing in Si/SiGe Quantum Dots APS March Meeting 2023

Conferences

APS March Meeting (Las Vegas, NV) 2023
ARO/LPS Quantum Computing Programming Review (Annapolis, MD) 2022

Awards/Honors

Allen G. Shenstone Prize in Physics – Awarded by Princeton to outstanding Physics upperclassmen undergraduates who have shown excellence in course work and promise in independent research. 2023
Manfred Pyka Memorial Prize in Physics – Awarded by Princeton to outstanding Physics underclassmen undergraduates who have shown excellence in course work and promise in independent research. 2022

*Full-time during summers of 2021 and 2022, part-time for all other times