

Sina Gholizadeh | CV

Centre for Quantum Software and Information - UTS Sydney – Australia

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Education

University of New South Wales

Doctor of Philosophy in PHYSICS

Supervisor: Prof. Dimitrie Culcer

Sydney, Australia

2020 – 2025

Bilkent University

Master of Science in PHYSICS

Thesis title: Analysis of the magnetic translation group and investigation of a one-dimensional topological model

Supervisor: Prof. Balázs Hetényi

Ankara, Turkey

2014 – 2017

University of Tabriz

Bachelor of Science in THEORETICAL PHYSICS and ASTROPHYSICS

Tabriz, Iran

2008 – 2013

Research Appointments

University of Technology Sydney

Strategic Research Accelerator

Centre for Quantum Software and Information (QSI)

Sydney, Australia

April 2026 – Present

Research Experience

PhD Research

- Studied $1/T_2^*$ in planar Ge hole qubits under single-charge noise using Schrieffer-Wolff perturbation theory, comparing analytical results to numerical simulations and highlighting the anisotropic behavior in terms of magnetic field orientation.
- We studied the impact of $1/f$ charge noise, modeled as an ensemble of Coulomb potentials, on the dephasing time (T_2^*) of Ge hole spin qubits in the presence of a magnetic field.
- Investigation of nonlinear electrical response in spin-3/2 hole systems.

Master's Research

- Topological investigation of the extended Creutz ladder model via studying the band structure, winding number, symmetry analysis, characteristic edge states, and transport properties.
- Studied the phase space translation operators and formed a group out of them using magnetic translation group properties.

Teaching Experience

PhD: First year Mechanical Physics lab demonstrator, Department of physics, Bilkent University

Master: Undergraduate Electromagnetic, Quantum Mechanics, and Classical Physics teaching assistant, Department of physics, Bilkent University

Publication

2024: Wang, Z., **Gholizadeh, S.**, Hu, X., Sarma, S.D. and Culcer, D., 2024. Dephasing of planar Ge hole spin qubits due to $1/f$ charge noise. arXiv preprint arXiv:2408.10302.

2023: **Gholizadeh, S.**, Cullen, J.H. and Culcer D., 2023. Nonlinear Hall effect of magnetized two-dimensional spin-3/2 heavy holes. Physical Review B, 107(4), p.L041301.

2018: **Gholizadeh, S.**, Yahyavi, M. and Hetényi, B., 2018. Extended Creutz ladder with spin-orbit coupling: A one-dimensional analog of the Kane-Mele model. EPL (Europhysics Letters), 122(2), p.27001.

Research Interest

- Spin qubit architectures
- Hole spin qubits
- Quantum transport in hole systems
- Quantum device modelling
- Fault-tolerant quantum computing
- Topological insulators and superconductors

Honors, Awards and Scores

2020 - 2024: Sydney Quantum Academy (SQA) Extension award at UNSW

2020 - 2024: Tuition Fee Scholarship (TFS) from UNSW Sydney

2014 - 2017: Graduate fellowship in master of science from Bilkent University

Workshops and Events

November 2025: Attended and participated in the poster session at the Gordon Godfrey Workshop 2025, School of Physics, The University of New South Wales, Sydney, Australia.

November 2024: Attended the 6th International Conference on Spin-Based Quantum Information Processing — SpinQubit6, Sydney, Australia.

September 2024: Participated in a poster presentation at the Silicon Quantum Electronics Workshop, Davos, Switzerland.

December 2023: Gave a talk at the ANZCOP-AIP Summer Meeting 2023, Canberra, Australia.

Computer Skills

Programming Languages: Python, Mathematica, Matlab

Tools: $\text{\LaTeX}$, Linux, Inkscape

Others: Quantum computing frameworks, Scientific computing libraries

Languages

- **Azerbaijani:** Native
- **Persian:** Native
- **English:** Fluent
- **Turkish:** Advanced