Charles Berger

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EDUCATION

University of California, Santa Barbara **GPA: 4.0**
College of Letters and Science, Bachelor of Science in Physics Degree expected June 2025

Dean's Honors: All academic year quarters aside from Fall 2023 due to taking a GE course with pass/no pass grading

Relevant undergraduate courses at UCSB:

- PHYS 150 (Special Topic-Quantum Information and Computation)
- PHYS 123A (Condensed Matter Physics)
- PHYS 123B (Condensed Matter Physics)
- PHYS 150 (Special Topic-Prototyping in Experimental Physics)

RESEARCH EXPERIENCE

Position: Undergraduate researcher

Research group: **UC Santa Barbara, Andrew Jayich Lab (**October, 2023 – Present) (website**)**

Research subject and work:

- Conducted experimental research on magnetic field stabilization for ion traps
- Worked on design and refinement of a system consisting of a PID controller, a current control PCB, a magnetometer, and Helmholtz coils
- Ran finite element analysis simulations to optimize magnetometer probe placement
- Field stabilization system has been implemented on two ion traps, improving coherence times and allowing new experiments to be pursued including of hyperfine splitting of Ra-225 ions

Knowledge acquired during research efforts:

- Printable circuit board design and prototype manufacturing
- Feedback loop PID control
- Modeling physical systems with computational methods like Finite Element Analysis

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SKILLS

Programming Languages:

- Python (data analysis, plotting, simulation, and numerical calculations)
- Arduino IDE (data acquisition and control platforms)

Software:

- Autodesk Fusion (3D CAD program that also generates CAM files for reductive manufacturing)
- Autodesk EAGLE (Printable circuit board designing program)
- FreeCAD (Open-source 3D CAD program)
- ElmerFEM (Open-source Multiphysics finite element analysis program)
- Gmsh (Open-source Mesh generating tool used to create custom meshes from CAD designs to use in FEA programs)

- Paraview (Open-source FEA post processing and visualization tool)

Hand-on skills:

- 3D printer calibration and operation with PLA and ABS filament types
- CNC milling of printable circuit boards and parts of various materials
- Soldering PCBs, wires, and electrical connectors

RECOGNITIONS

Promising Experimentalist:

- Recognized by Professor Deborah Fygenson at UCSB in PHYS 20AL-CL course series Winter quarter 2023 as a promising experimentalist
- Distinction limited to only 14 of the 121 students taking the course
- Lead to the opportunity and funding to design and carry out the student's own personal experiment as a final project for the course