

Huaxu Dan

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Education

University of California, Santa Barbara

College of Creative Studies, B.S. in Physics

GPA: 3.98/4.00

September 2021 – Expected June 2025

Publication

- “Radium Ion’s Metastable $6d^2D_{5/2}$ and $6d^2D_{3/2}$ State Lifetimes,” Haoran Li, **Huaxu Dan**, Mingyu Fan, Spencer Kofford, Robert Kwapisz, Roy A. Ready, Akshay Sawhney, Merrell Brzeczek, Craig Holliman, and Andrew M. Jayich, S. G. Porsev, M. S. Safronova. Manuscript in preparation.
- “Laser Cooling of Radium-225 Ions,” Roy Ready, Haoran Li, Spencer Kofford, Robert Kwapisz, **Huaxu Dan**, Akshay Sawhney, Mingyu Fan, Craig Holliman, Xiaoyang Shi, Luka Sever-Walter, A. N. Gaiser, J. R. Griswold, A. M. Jayich. <https://doi.org/10.48550/arXiv.2407.14721>

Research Experience

Cryogenic System Design for Radium-bearing Molecular Ion Spectroscopy May 2024 – Present

Andrew Jayich Lab, UCSB

- Designed a double-ended, toroidal resonator on a printed circuit board as the ion trap drive.
- Designed a DC system to supply endcap voltages and to impose bias voltages on RF electrodes.
- Leaked in acetylene gas into a room temperature vacuum chamber to test producing RaCC^+ . Ran optical mass spectrometry to confirm the species produced.
- Working on in-vacuum radiation suppression.

Measurement of Radium Ion’s Metastable States Lifetimes January 2024 – May 2024

Andrew Jayich Lab, UCSB

- Wrote experiment sequence codes using *Advanced Real-Time Infrastructure for Quantum physics (ARTIQ)* experiment control software.
- Took and analyzed data. Analyzed systematic effects.
- Wrote and edited the manuscript.

Laser Cooling of Radium-225 Ions June 2023 – January 2024

Andrew Jayich Lab, UCSB

- Assembled a microwave antenna for hyperfine splitting measurement.
- Improved ion trap resonator for better trapping stability.
- Took data for the quadratic Zeeman shift measurement.
- Set up offset lock, Pound-Drever-Hall lock, and double passes.

Characterization of Ion Traps at Cryogenic Temperature October 2021 – December 2022

Andrew Jayich Lab, UCSB

- For the first time trapped an ion in a 3D printed ion trap in a cryogenic setup.
- Designed a DC system for operating different ion traps.
- Took data for the heating rate measurement of a surface ion trap.
- Loaded Strontium oven as neutral atom source.

Development of a Command Line Window Manager October 2021 – November 2021

Andrew Jayich Lab, UCSB

- Developed a Python package, *Tray launcher*, to manage command line windows in a small GUI widget.
- *Tray launcher* can be downloaded at [PyPi](#).

Talks and Posters

- *Toward Quantum Logic Spectroscopy on Radium-Based Molecular Ion* Poster, North American Conference on Trapped Ions (08/2024)
- *Toward Quantum Logic Spectroscopy of Radium-Bearing Molecular Ion* Talk, Worster Summer Research Fellowship Symposium, UCSB (10/2024)
- *Toward Quantum Logic Spectroscopy of Radium-Bearing Molecular Ion* Talk, Undergraduate Research Symposium, UCSB (09/2024) [video](#)
- *Laser Cooling of Radium-225 Ion* Talk and poster, Summer Undergraduate Research Fellowship Symposium, UCSB (11/2023)

Awards

- Worster Summer Research Fellowship, UCSB (06/2024)
- Summer Undergraduate Research Fellowship, College of Creative Studies, UCSB (06/2023)

Mentorship

- Lab proctor for the *U.S. International Physics Olympiad Traveling Team for Mini Training Camp* (08/2023)
- Grader for the *Seminar on Special Relativity* (04/2021)

Technical Skills

- Proficiency in **Python** for writing pulse sequence and analysis
- Proficiency in printed circuit board design with **Eagle** and **Fusion**, experience with **Altium**
- Experience with cryogenic system and room temperature ultrahigh vacuum system
- Experience in free space optics and external cavity diode lasers
- Experience with high-finesse cavities for Pound-Drever-Hall lock
- Experience with CAD modeling with **Inventor**
- Experience with simulation with **COMSOL**
- Experience with **Mathematica**
- Experience with micro-controllers such as **Arduino** and **RedPitaya**

Graduate-Level Coursework

- PHYS 205 Classical Mechanics
- PHYS 210 Electromagnetism
- PHYS 215 Quantum Mechanics
- PHYS 219, 220 Statistical Mechanics
- PHYS 221 Quantum Field Theory (in progress)