

Mingyu Fan

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Education

2017 – Present *University of California, Santa Barbara, Santa Barbara, CA*

M.A. in Physics, June 2020

Ph.D. in Physics, currently a fifth-year graduate student, degree anticipated June 2023

2013 – 2017 *University of California, Los Angeles, Los Angeles, CA*

B.S. in Physics with departmental honors, with a minor in Mathematics, March 2017

Research Experience

Physics Department, University of California, Santa Barbara

2017 – Present Graduate Student Researcher

Research advisor: Dr. Andrew Jayich

- Worked on linear Paul traps with radium and strontium ions.
- Conducted experiments of the first laser cooling of radium ions, spectroscopy of radium ions, and production of radium-based molecular ions that are identified by a novel technique.

Physics Department, University of California, Los Angeles

2015 – 2017 Undergraduate Researcher

Research advisor: Dr. Gary Williams

- Worked on an experiment probing Kosterlitz-Thouless transition in thin films of superfluid ^4He on carbon nanotubes.
- Conducted Monte Carlo simulation on 2D XY model with custom boundary conditions and finite time quenches.

Mentoring Experience

Physics Department, University of California, Santa Barbara

June 2017 – August 2017 Mentor for research experience for teachers (RET) program

- Mentored a high school teacher on building imaging system for single ions in a linear Paul trap and testing innovative design of atomic ovens.

July 2020 – September 2020 Graduate student mentor of the Eddleman Fellowship program

- Mentored an undergraduate student on cavity-enhanced velocity modulation spectroscopy of heavy molecular ions.

July 2021 – September 2021 Graduate student mentor of the Worster Fellowship program

- Mentored an undergraduate student on realizing adiabatic rapid passage of the optical qubit of a trapped Ra^+ ion.

Publications

Measurement of the Ra^+ $7p\ ^2P_{3/2}$ state lifetime

M. Fan, C. A. Holliman, A. Contractor, C. Zhang, S. Gebretsadken, A. M. Jayich
In preparation.

A Radium Ion Optical Clock

C. A. Holliman, **M. Fan**, A. Contractor, A. M. Jayich
Physical Review Letters (in press).

Optical Mass Spectrometry of Cold $RaOH^+$ and $RaOCH_3^+$

M. Fan, C. A. Holliman, X. Shi, H. Zhang, M. W. Straus, X. Li, S. W. Buechele, A. M. Jayich
Physical Review Letters **126**, 023002 (2021)

Direct measurement of the $7s\ ^2S_{1/2} \rightarrow 7p\ ^2P_{3/2}$ transition frequency in $^{226}Ra^+$

C. A. Holliman, **M. Fan**, A. Contractor, M. W. Straus, A. M. Jayich
Physical Review A **102**, 042822 (2020)

Measurements of Electric Quadrupole Transition Frequencies in $^{226}Ra^+$

C. A. Holliman, **M. Fan**, A. M. Jayich
Physical Review A **100**, 062512 (2020)

Measurement of the $7p\ ^2P_{3/2}$ State Branching Fractions in Ra^+

M. Fan, C. A. Holliman, S. G. Porsev, M. S. Safronova, A. M. Jayich
Physical Review A **100**, 062504 (2020)

Laser Cooling of Radium Ions

M. Fan, C. A. Holliman, A. L. Wang, and A. M. Jayich
Physical Review Letters **122**, 223001 (2019)

Superfluid onset and compressibility of 4He films adsorbed on carbon nanotubes

Emin Menachekanian, Vito Iaia, **Mingyu Fan**, Jingjing Chen, Chaowei Hu, Ved Mittal, Gengming Liu, Raul Reyes, Fufang Wen, Gary A. Williams
Physical Review B **99**, 064503 (2019)

Talks

Cold, trapped radium-based molecular ions for probing new physics

Invited talk, CERN ISOLDE Seminar, online, March 2021

All-optical sub-amu ion mass spectrometry

Contributed talk, DAMOP, online, June 2020

Laser cooling of radium ions

Contributed talk, DAMOP, Milwaukee, WI, May 2019

Laser cooling of radium ions

Invited talk, UC Berkeley Special AMO Seminar, Berkeley, CA, April 2019

Probing fundamental symmetries with radium ions

Contributed talk, UCSB light science workshop, Santa Barbara, CA, April 2018