

# Andrew Jayich

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## Education

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*Ph.D Physics, Yale University, New Haven, CT* 2012

*A.B. Physics, Harvard University, Cambridge, MA* 2004

## Research Experience

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**Assistant Professor** 2016–present  
*University of California, Santa Barbara, Santa Barbara, CA*

**Postdoctoral Researcher** 2012–2016  
*University of California, Los Angeles, Los Angeles, CA*  
Led a team that demonstrated laser cooling and trapping of atoms with an optical frequency comb on a two-photon transition.

**Postdoctoral Researcher** 2011–2012  
*California Institute of Technology, Pasadena, CA*  
Worked on enhancing the quality factor of an optomechanical system with an optical spring.

**Graduate Student Researcher** 2005–2011  
*Yale University, New Haven, CT*  
Laser cooled an optomechanical system anchored to a  $^3\text{He}$  cryostat close to its quantum ground state.

**Undergraduate Student Researcher** 2001–2005  
*Harvard University, Cambridge, MA*  
Worked in John Doyle's lab on creating a Bose-Einstein condensate (BEC) via buffer gas and evaporative cooling

## Publications

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*Optical mass spectrometry of cold  $\text{RaOH}^+$  and  $\text{RaOCH}_3^+$*   
M. Fan, C. A. Holliman, X. Shi, H. Zhang, M. W. Straus, X. Li, S. W. Buechele, A. M. Jayich  
[PRL, 126, 023002 \(2021\)](#)

*Electron electric dipole moment searches using clock transitions in ultracold molecules*  
Mohit Verma, Andrew M. Jayich, Amar C. Vutha  
[PRL, 125, 153201 \(2020\)](#)

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

C. A. Holliman, M. Fan, A. Contractor, M. W. Straus, A. M. Jayich

[PRA, \*\*102\*\*, 042822 \(2020\)](#)

*Measurements of electric quadrupole transition frequencies in  $^{226}\text{Ra}^+$*

C. A. Holliman, M. Fan, A. M. Jayich

[PRA, \*\*100\*\*, 062512 \(2019\)](#)

*Measurement of the  $7p^2P_{3/2}$  state branching fractions in  $\text{Ra}^+$*

M. Fan, C. A. Holliman, S. G. Porsev, M. S. Safronova, A. M. Jayich

[PRA, \*\*100\*\*, 062504 \(2019\)](#)

*Suppressed Spontaneous Emission for Coherent Momentum Transfer*

Xueping Long, Seejia S. Yu, Andrew M. Jayich, Wesley C. Campbell

[PRL, \*\*123\*\*, 033603 \(2019\)](#)

*Laser Cooling of Radium Ions*

M. Fan, C. A. Holliman, A. L. Wang, A. M. Jayich

[PRL, \*\*122\*\*, 223001 \(2019\)](#)

*Phonon lasing from optical frequency comb illumination of trapped ions*

M. Ip, A. Ransford, A.M. Jayich, X. Long, C. Roman, and W.C. Campbell

[PRL, \*\*121\*\*, 043201 \(2018\)](#)

*Direct frequency comb laser cooling and trapping*

A.M. Jayich, X. Long, and W.C. Campbell

[Phys. Rev. X, \*\*6\*\*, 041004 \(2016\)](#)

*Continuous all-optical deceleration and single-photon cooling of molecular beams*

A.M. Jayich, A.C. Vutha, M.T. Hummon, J.V. Porto, and W.C. Campbell

[Physical Review A, \*\*89\*\*, 023425 \(2014\)](#)

*Cryogenic optomechanics with a  $\text{Si}_3\text{N}_4$  membrane and classical laser noise*

A.M. Jayich, J.C. Sankey, K. Bjorke, D. Lee, C. Yang, M. Underwood, L. Childress, A. Petrenko, S.M. Girvin, and J.G.E. Harris

[New Journal of Physics, \*\*14\*\*, 115018 \(2012\)](#)

*Fiber-cavity-based optomechanical device*

N.E. Flowers-Jacobs, S.W. Hoch, J.C. Sankey, A. Kashkanova, A.M. Jayich, C. Deutsch, J. Reichel, and J.G.E. Harris

[Applied Physics Letters, \*\*101\*\*, 221109 \(2012\)](#)

*Strong and Tunable Nonlinear Optomechanical Coupling in a Low-Loss System*

J.C. Sankey, C. Yang, B.M. Zwickl, A.M. Jayich, and J.G.E. Harris

[Nature Physics, \*\*6\*\*, 707 \(2010\)](#)

*Dispersive optomechanics: a membrane inside a cavity*

A.M. Jayich, J.C. Sankey, B.M. Zwickl, C. Yang, J.D. Thompson, S.M. Girvin, A.A. Clerk, F. Marquardt, and J.G.E. Harris

[New Journal of Physics, 10, 095008 \(2008\)](#)

*High quality mechanical and optical properties of commercial silicon nitride membranes*

B.M. Zwickl, W.E. Shanks, A.M. Jayich, C. Yang, A.C. Bleszynski Jayich, J.D. Thompson, J.G.E. Harris

[Applied Physics Letters, 92, 103125 \(2008\)](#)

*Strong dispersive coupling of a high-finesse cavity to a micromechanical membrane*

J.D. Thompson, B.M. Zwickl, A.M. Jayich, F. Marquardt, S.M. Girvin, and J.G.E. Harris

[Nature, 452, 06715 \(2008\)](#)

*Stable, mode-matched, medium-finesse optical cavity incorporating a micromechanical cantilever*

J.G.E. Harris, B.M. Zwickl, and A.M. Jayich

[Review of Scientific Instruments, 78, 013107 \(2007\)](#)

## Conference Proceedings

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*Improved "Position Squared" Readout Using Degenerate Cavity Modes*

J.C. Sankey, A.M. Jayich, B.M. Zwickl, C. Yang, and J.G.E. Harris

[Proceedings of the XXI International Conference on Atomic Physics, \(2009\)](#)

edited by R. Cote, P.L. Gould, and M. Rozman, World Scientific, Singapore

*Linear optical properties of a high-finesse cavity dispersively coupled to a micromechanical membrane*

J.G. E. Harris, A.M. Jayich, B.M. Zwickl, C. Yang, and J.C. Sankey

[SPIE, 6907, \(2008\)](#)

## Talks

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*Radium ions and cold radioactive molecules*

**Invited Talk**, Virtual AMO Seminar (VAMOS), Zoom/Youtube, April 2021

*Opportunities with laser-cooled radium ions*

**Invited Talk**, Quantum Foundry seminar, UC Santa Barbara, March 2021

*Cold Charged Radium*

**Invited Talk**, APS DAMOP, Portland, Oregon (via Zoom), June 2020

*Quantum simulation tools for precision measurement*

**Invited Talk**, CAIQUE research coordination meeting, virtual zoom meeting, March 2020

*Radium: a platform for precision measurement*

**Invited Talk**, Physics of Quantum Electronics 2020, Snowbird, Utah, January 2020

*Radium: An unstable cornerstone for precision measurement*

**Invited Talk**, Optical, Molecular, and Quantum Science (OMQ) Fall Symposium 2019, Bend, Oregon, September 2019

*Deformed and unstable cornerstones for precision measurement*

**Invited Talk**, FRIB Topical Program: Hadronic Electric Dipole Moments in the FRIB Era: From the Proton to Protactinium, FRIB/MSU, East Lansing, Michigan, August 2019

*One year with laser-cooled radium ions*

**Invited Talk**, Quantum optics seminar, University of Toronto, Toronto, Canada, August 2019

*(Slow) Heavy Ions*

**Invited Talk**, Monroe Lab, College Park, Maryland, June 2019

*Radium: An unstable cornerstone for precision measurement*

**Invited Talk**, Physics Colloquium, University of Nevada, Reno, October 2018

*Trapping heavy and deformed nuclei for a long, long time*

**Invited Talk**, KITP - High Energy Physics at the Sensitivity Frontier, Santa Barbara, CA, April 2018

*Direct frequency comb laser cooling and trapping*

**Invited Talk**, UCSD Condensed Matter Seminar, San Diego, CA, May 2017

*Frequency comb cooling for organic quantum chemistry*

**Invited Talk**, CAIQUE conference, Los Angeles, CA, September 2016

*Direct frequency comb laser cooling and trapping*

**Invited Talk**, UC Berkeley AMO seminar, Berkeley, CA, September 2016

*Direct frequency comb two-photon laser cooling and trapping*

Contributed Talk, DAMOP, Providence, RI, May 2016

*Direct frequency comb laser cooling and trapping*

**Invited Talk**, UCSB, Santa Barbara, CA, April 2016

*Laser cooling and trapping with optical frequency combs*

Contributed Talk, DAMOP, Columbus, OH, June 2015

*Laser cooling and trapping with optical frequency combs*  
**Invited Talk**, UCSB, Santa Barbara, CA, January 2015

*Continuous all-optical deceleration of molecular beams*  
Contributed Talk, DAMOP, Madison, WI, June 2014

*Optomechanics with SiN membranes: Laser cooling starting with a 400 mK base temperature*  
**Invited Talk**, Cal State Univeristy - Los Angeles Physiscs Colloquium, Los Angeles, CA, Oct. 2012

*Resolved Sideband Laser Cooling of a Cryogenic Micromechanical Membrane*  
**Invited Talk**, USC, Los Angeles, CA, June 2011

*Resolved Sideband Laser Cooling of a Cryogenic Micromechanical Membrane*  
**Invited Talk**, Caltech, Pasadena, CA, June 2011

*Resolved Sideband Laser Cooling of a Cryogenic Micromechanical Membrane*  
**Invited Talk**, IBM Almaden Research Center, San Jose, CA, June 2011

*Resolved Sideband Laser Cooling of a Cryogenic Micromechanical Membrane*  
**Invited Talk**, Stanford, Palo Alto, CA, June 2011

*Resolved Sideband Laser Cooling of a Cryogenic Micromechanical Membrane*  
Contributed Talk, CLEO, Baltimore, MD, May 2011

*Optomechanics with a dispersive optomechanical system*  
**Invited Talk**, École Normale Supérieure, Paris, France, Jan. 2009

*High quality optical and mechanical properties of a dispersive optomechanical device*  
Contributed Talk, APS March Meeting, New Orleans, LA, March 2008

*Laser cooling of a microcantilever using a medium-finesse optical cavity*  
Contributed Talk, APS March Meeting, Denver, CO, March 2007

## Awards

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*Moore Foundation Physics Innovation Award, 2020*

*Best Poster Award, QOMNS conference, Monte Verità - Ascona, Switzerland, 2011*

*Presidential Scholar in Academics, 2000*