

Yale Physics



For further information on any of the items included here or if you would like to contribute to the next newsletter, send email to [Daphne Klemme](mailto:Daphne.Klemme@yale.edu).

Upcoming Events of Interest

Monday, September 30

10:00am Dissertation Defense. Christopher Davis, Yale University, "Search for Neutrinoless Double Beta Decay with Majoron Emission in CUORE" in WL 216. Thesis Advisor: Reina Maruyama.

11:00am Yale Quantum Institute Talk. Angela Kou, Microsoft Quantum Lab Delft, "Nanowire-based superconducting circuits" in YQI Seminar Room.

4:00pm Department of Chemistry Silliman Lecture in Inorganic Chemistry. Lynden Archer, Cornell University, "Electrokinetics and Ion-Transport at Metal-Electrolyte Interphases in Secondary Batteries" in SCL 111.

Tuesday, October 1

11:00am Yale Purchasing Services 2019 Annual Scientific Vendor Expo. West Campus Conference Center, 800 W. Campus Dr., 1st Floor Conference Room. Enjoy complementary lunch - raffles, giveaways, samples.

12:00pm Yale Physics Professional Development Organization Discussion. Chris Davis, Yale University, "Getting a Job in Data Science" in WL 216. [RSVP required for Pizza at 11:45am](#).

2:00pm Atomic Physics Seminar. Federica Cataldini, TU Wein, "Exciting phonon modes in a one dimensional Bose Einstein condensate" in SPL 52. Hosts: Nir Navon and Leonid Glazman.

4:00pm Particle/High Energy Theory Seminar. Gabriel Cuomo, École polytechnique fédérale de Lausanne, Switzerland, "The epsilon expansion meets semiclassics" in SPL 52. Host: David Poland.

4:00pm University Librarian reception to celebrate the re-opening of the newly renovated Anne T. and Robert M. Bass Library. The reception will be held on the library's Courtyard Lavel. Light refreshments will be served.

Wednesday, October 2

11:00am Yale Purchasing Services 2019 Annual Scientific Vendor Expo. Science Hill - Sterling Chemistry Labs. Enjoy complementary lunch - raffles, giveaways, samples.

2:00pm 3D Printing Workshop: Introduction to design and fabrication in WL 216. [RSVP here](#).

2:30pm Mechanical Engineering & Materials Science Seminar. Noah J. Cowan, Johns Hopkins University, "Can Intact Motor Control and Learning Mechanisms Help People with Ataxia?". Host: Rebekka Kramer. ML 107 (Refreshments served at 2:15pm).

4:15pm Department of Mathematics Colloquium. Amir Mohammadi, UCSD, "Geodesic planes in hyperbolic 3-manifolds" in LOM 215.

Thursday, October 3

11:00am Yale Purchasing Services 2019 Annual Scientific Vendor Expo. Medical School - Anlyan Center, 300 Cedar St., Upper/Lower Lobby & 2nd Floor. Enjoy complementary lunch - raffles, giveaways, samples.

1:00pm Nuclear Particle Astrophysics (NPA) Seminar. Chelsea Bertram, UW Seattle, "The Unexpected World of Discrete Fundamental Symmetries, from Positronium to Axions" in WL 216. [RSVP here by 9/30/19 for lunch in WLC-245 at 12:00pm](#).

2:30pm Yale Astronomy & Astrophysics Colloquium. Yuan-Sen Ting, Institute for Advanced Study, "The formation and evolution of the Milky Way" in WTS A-51.

4:00pm Department of Chemistry 2019 Treat B. Johnson Lecture in Organic Chemistry and Chemical Biology. Stephen Benkovic, Pennsylvania State University, "Biochemistry in the Cell: The Purinosome Metabolon" in SCL 110.

Friday, October 4

12:00pm Yale Quantum Institute Seminar. Ondrej Cernotik, Palacky University, "Improved optomechanical interactions for quantum technologies from hybrid membranes to optical levitation" in YQI Seminar Room. Host: Steven Girvin.

12:00pm Poorvu Center for Teaching & Learning STEMinar. Hortensia Soto, University of Northern Colorado, "Equity in Teaching Collegiate Mathematics: The Possible Role of Embodied Cognition" in WTS B-74. [Registration required](#).

4:00pm Department of Geology & Geophysics Colloquium. Johannes Müller, Museum für Naturkunde, "Bones, limbs, and lizards: tracking convergent and environmental adaptations in squamate reptiles" in KGL 123

[More events](#)

Save the Date!

October 5, 2019 Gotham-Metro Condensed Matter Meeting. Rosenthal Pavilion, New York University, [Register here](#).

October 11, 2019 Yale Office of Career Strategy, GSAS & Postdocs for a site visit to United Technologies Research Center in East Hartford, CT. Transportation Provided. Apply to attend by September 30th through your Yale Career Link Account <https://yale-csm-symlicity.com/students/>

October 12, 2019 Yale Physics Olympics

October 21-23, 2019 2019 [Workshop on Exploring New Science Frontiers at NSLS-II](#). Wang Center, Stony Brook University, Brookhaven National Laboratory. Please [register](#) by Monday, September 23, 2019 at

November 16, 2019 Girls' Science Investigations Session #2 (The World of Sound)

December 3, 2019 Society of Physics Students Tinsley Lecture: Wolfgang Ketterle, MIT, "Title TBA"

January 17, 2020 American Physical Society Conference for Undergraduate Women in Physics at Yale

February 8, 2020 Girls' Science Investigations Session #3 (The Electronic World)

March 25, 2020 / March 30, 2020 / April 2, 2020 What Flashes Up: The Material Force of Justice, SpaceTimeMattering, and Constellations of Theological-Political-Scientific Thought (2019-20 Terry Lectures) in LUCE 101 (Auditorium)


March 26-27, 2020 Physics and Applied Physics Graduate Open House for prospective graduate students.

March 30, 2020 43rd Rosenthal Lecture: Prof. Francesca Ferlaino, University of Innsbruck, "Title TBA"

April 4, 2020 Girls' Science Investigations Session #4 (The Geophysical World)

Department News

Dissertation Defense



Yale Department of Physics
Charles Brown
Yale University

Tuesday, September 10, 2019 at 9:00 a.m. in SPL 57

Optical, Mechanical and Thermal Properties of Superfluid Liquid Helium Drops Magnetically-Levitated in Vacuum

The field of optomechanics studies the interactions between light and the motion of an object. One of the goals in this field is to generate and control highly non-classical motion of a massive mechanical oscillator. There has been progress in generating such non-classical motion via coupling the oscillator to a qubit, or by utilizing the non-linearity of single photon detection. However, interest still remains in generating non-classical motion directly via the optomechanical interaction itself. Doing so requires strong coupling between the light and the mechanical oscillator, as well as low optical and mechanical loss and temperature. The unique properties of superfluid helium [zero viscosity, high structural and chemical purity and extremely low optical loss] address some of these requirements.

To exploit the unique properties of superfluid helium we have constructed an optomechanical system consisting entirely of a magnetically levitated drop of superfluid helium in vacuum. Magnetic levitation removes a source of mechanical loss associated with physically-clamped oscillators. Levitation also allows the drop to cool itself efficiently via evaporation. The drop's optical whispering gallery modes (WGMs) and its surface vibrations should couple to each other via the usual optomechanical interactions.

In this dissertation we demonstrate the stable magnetic levitation of superfluid helium drops in vacuum and present measurements of the drop's evaporation rates, temperatures, optical modes and surface vibrations. We found optical modes with finesse $\sim 10^5$ (limited by the drop's size). We found surface vibrations with decay rates ~ 1 Hz (in rough agreement with theory). Lastly, we found that the drops reach a temperature $T \sim 200$ mK, and that a single drop can be trapped indefinitely.

Thesis Advisor: Jack Harris

Congratulations to Charles Brown on the successful defense of his dissertation "Optical, Mechanical and Thermal Properties of Superfluid Liquid Helium Drops Magnetically-Levitated in Vacuum" on Tuesday, September 10, 2019. Thesis Advisor: Jack Harris.

[More](#)



Physics majors welcomed into department in annual hoodie ceremony on Friday, September 20, 2019.

[More](#)



The Physics website is being updated! Look here for updates on the progress.

New Pages:

- [About Page](#)
- [Submit Physics Department Images](#)
- We are in the process of restructuring the Research page, look for more information shortly.

Community



The [Climate and Diversity Committee](#) (CDC) convenes once a month.

Yale's [semi-annual report of Complaints of Sexual Misconduct](#) was recently released.

The number of reported complaints continues to rise, while everyone hopes this is due to a continuing increase in awareness of Yale's resources and willingness to submit a complaint, it remains true that many instances of sexual assault are unreported.

If you need help, the SHARE Center (<https://sharecenter.yale.edu/>) is available at 203-432-2000 (a 24-hr confidential hotline) for information, advocacy and support. Further resources regarding prevention and reporting of sexual misconduct at Yale can be found at smr.yale.edu

If interested in joining please contact Helen Caines

Hints & Tips

Workday

There are several tasks in Workday, such as manage direct deposit, that you can do for yourself! [Click here to see a list of tasks \(with links to training materials\)](#).

Announcements

[Please click here for updates on the Yale Science Building, including a new logistics plan](#). The project encompasses the construction of a new state of the art sciences laboratory at the approximate location of the demolished J.W. Gibbs building, a comprehensive renovation of the KBT Plaza, a lecture hall, and a common area at the south end of KBT Plaza.

Flu Shot Time!

[Flu Shot Clinics](#)

Flu shots are free for all Yale staff, faculty, students, seniors and Yale Health members.

Adults and children (5 years and older) can go to any of the flu clinics.

Children 6 months through 4 years can ONLY go to the flu clinics offered at the Yale Health Pediatrics Department.

Children under 18 years old must be accompanied by an adult.

High dose flu vaccine is available at all of the flu clinics except the ones held at the Yale Health Pediatrics Department.

Opportunities

A postdoctoral position in [Computational Biology](#) is available in the [Koo laboratory](#) at the Simons Center for Quantitative Biology at Cold Spring Harbor Laboratory.

A [Tenure-Track Assistant Professor](#) opportunity at Fairfield University.



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