2024 Physics Department

Welcome & First Tea

Our Science

OUR HISTORY

A Tradition of Scientific Discovery

Physics continues to flourish at Cal

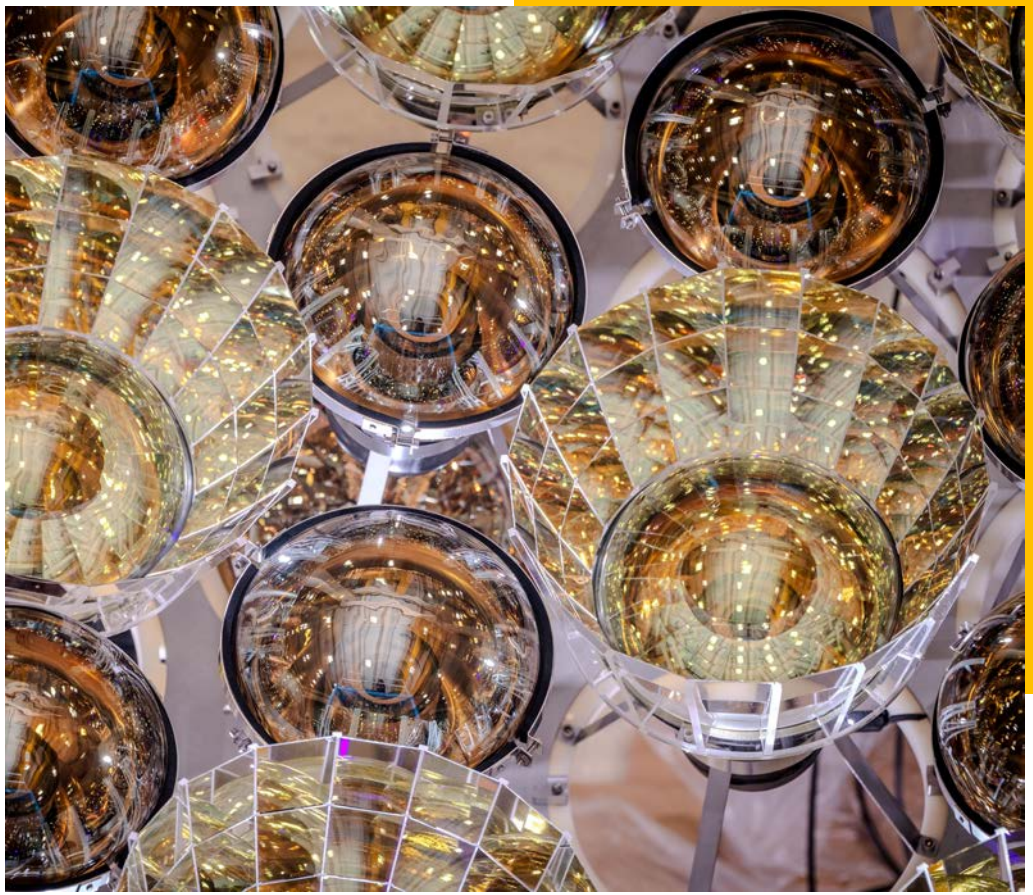
From accelerators to atoms, achievements in a wide spectrum of scientific disciplines continue to bring distinction to the department in the form of prizes, technology transfer, impactful papers, and distinguished alumni.

Berkeley Physics

PARTICLE PHYSICS

Advances in neutrino detection

A new type of neutrino detector, Eos, is now being tested in a vast underground lab at the University of California, Berkeley. It is designed to leverage the latest technologies to enhance the sensitivity and capabilities of antineutrino detectors.

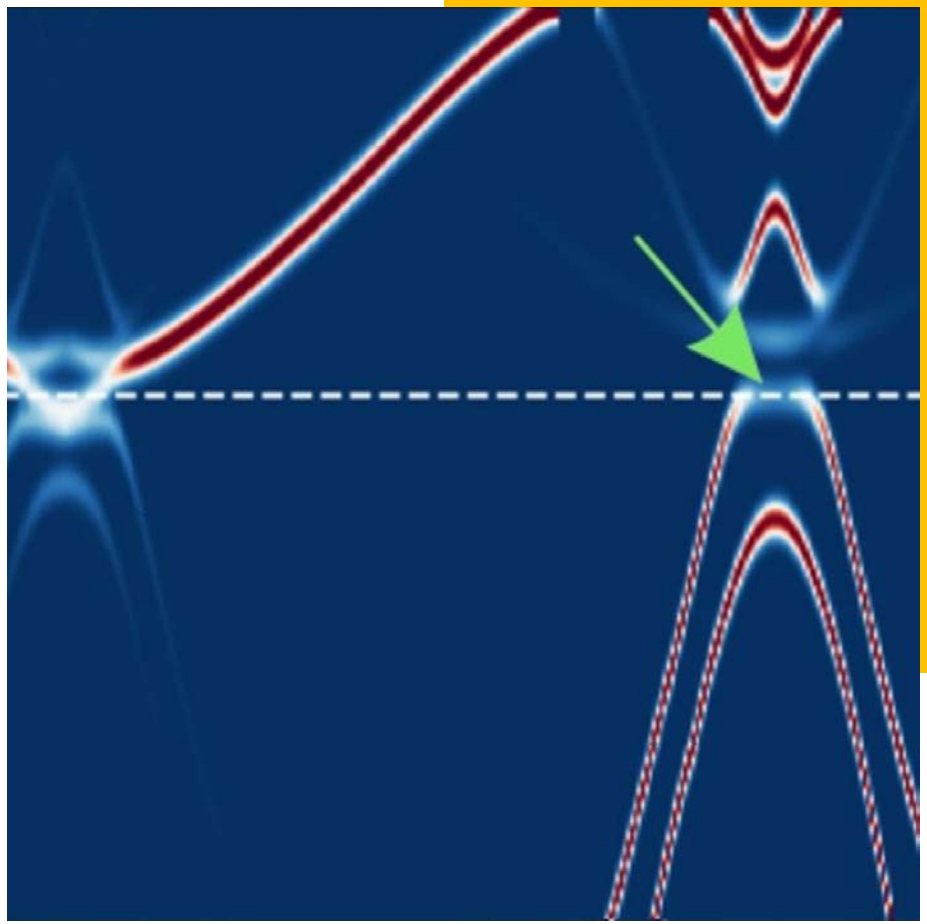


Berkeley Physics

QUANTUM MATERIALS

Light transforms insulating material

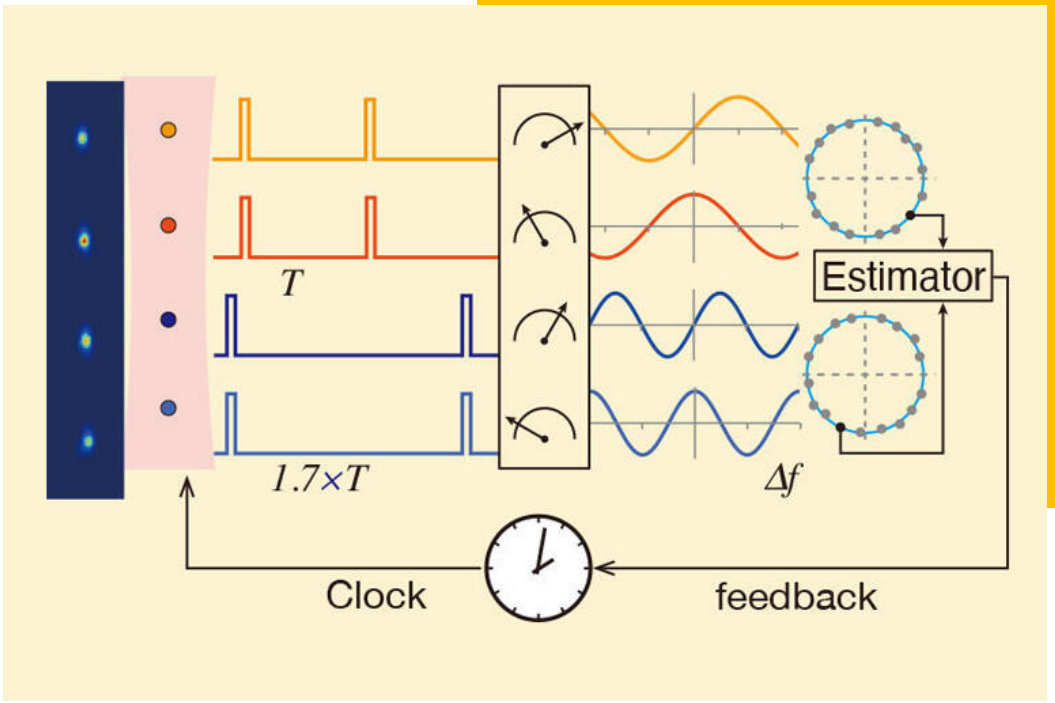
A UC Berkeley/LBNL study shows how light can transform an insulating material into a semimetal. Exposing this material to ultrafast laser pulses alters its energy states and the movement of the electrons and, above a threshold fluence, transforms it into a semimetal for a short period of time (just under 500 femtoseconds).



Berkeley Physics

Splitting up an atomic clock

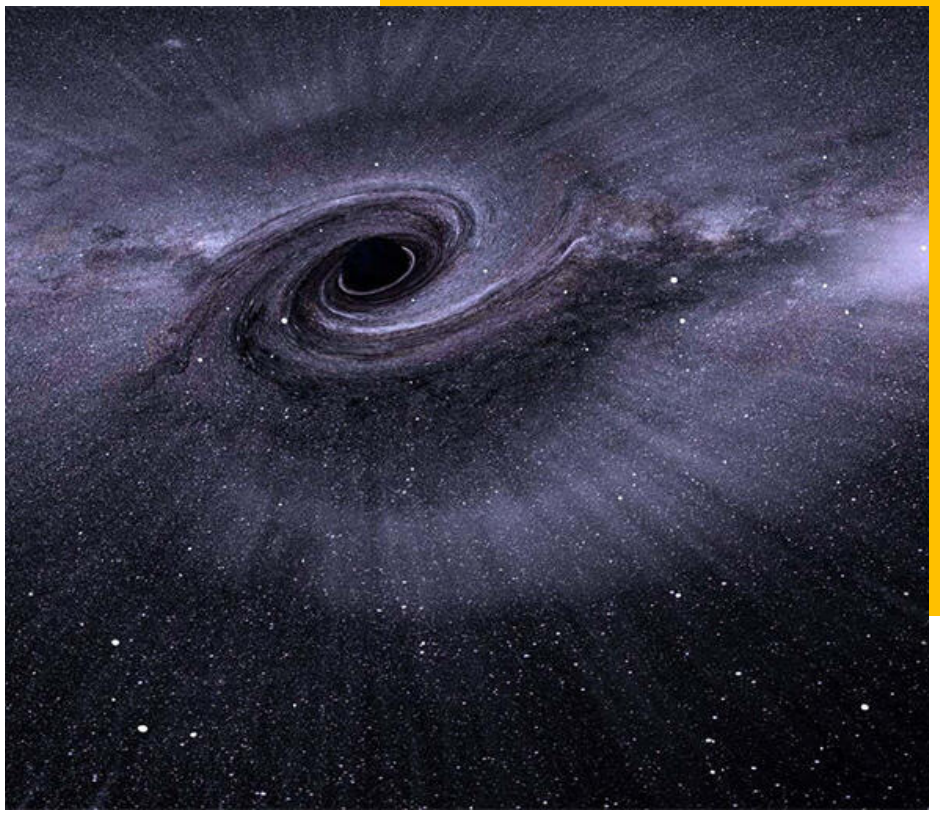
Standard atomic clocks treat all the atoms in the clock the same, measuring them all identically and at once. We show that by instead splitting the atoms up into multiple atomic ensembles that are spatially resolved and independently controlled, we can more precisely measure the frequency difference between the atomic transition and the clock laser.



QUANTUM PHYSICS THEORY

Solving the information paradox

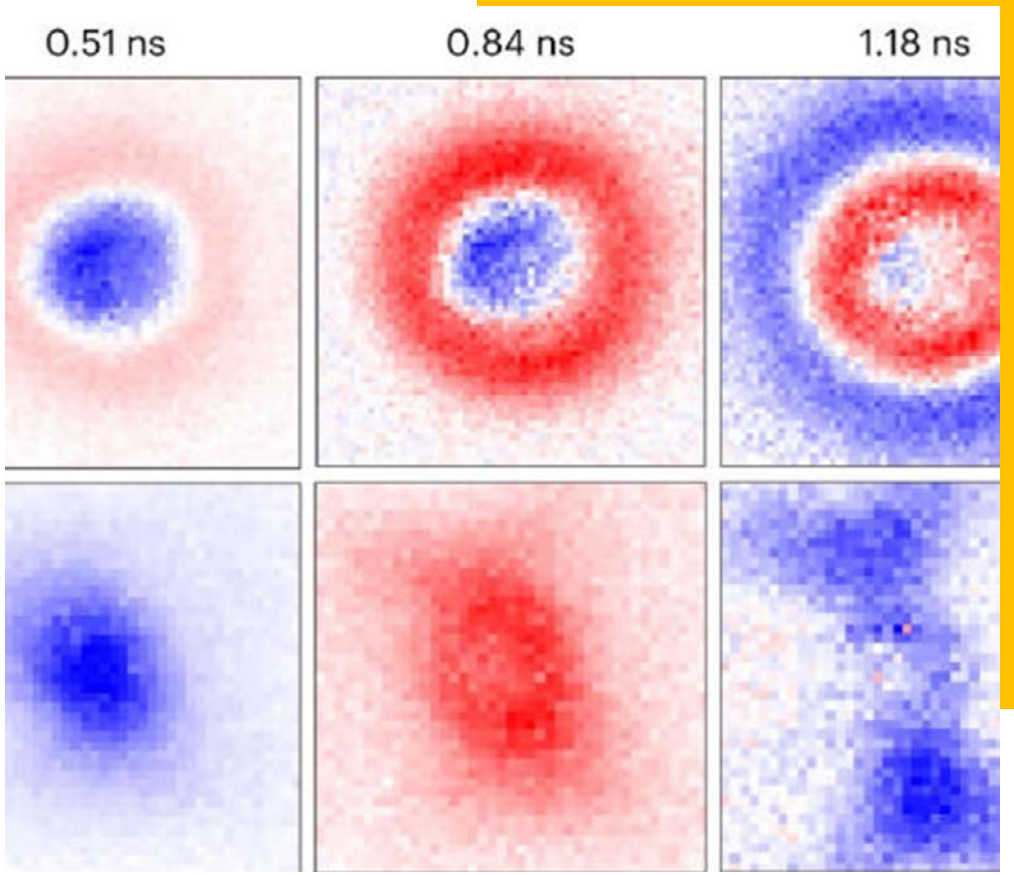
We may be able to find out what happens to matter that falls into a black hole, something previously thought impossible. This is because some parts of a black hole's interior, called "islands", may actually poke far enough outside the hole for us to measure them. If we can do this, then Stephen Hawking's long-standing black hole paradox might finally be resolved.



Berkeley Physics

Extending the range of information storage

• Recent progress has shown the potential of spin wavepackets – collective excitations of electron spin – to transport quantum information over large distances in a class of materials known as antiferromagnets.



ASTROPHYSICS EXPERIMENT

When an aurora is not an aurora

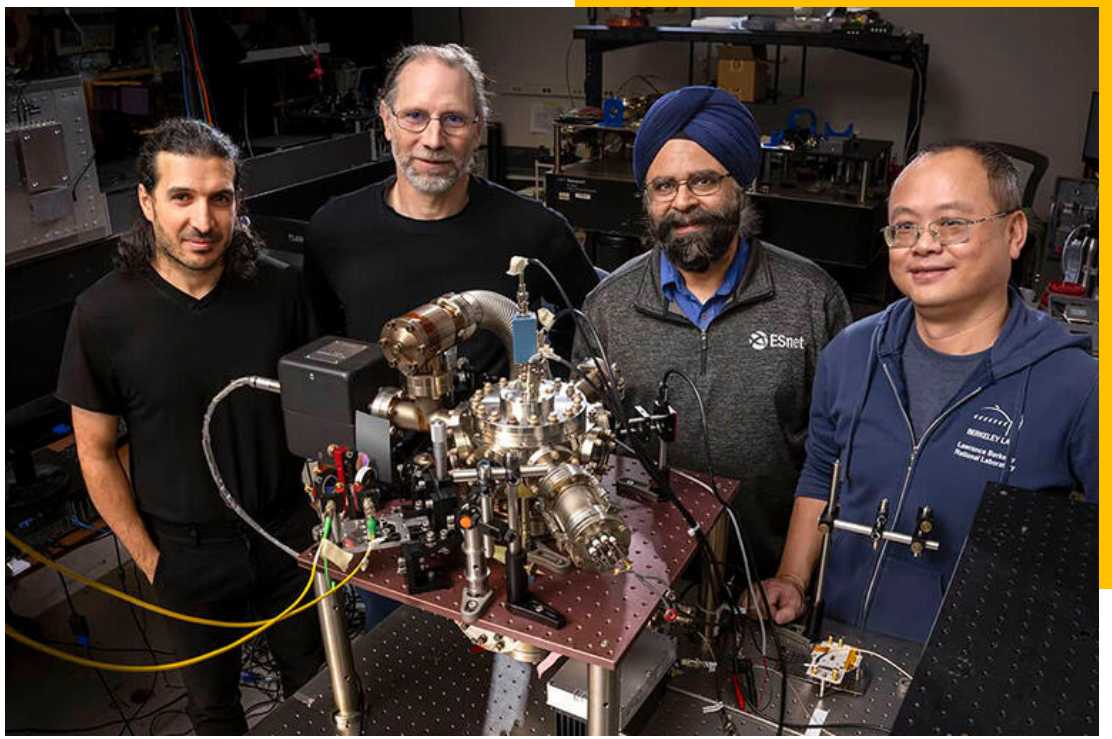
The purple and white emissions at the top are referred to as "Steve," while the green emissions are called "picket fence." The rare phenomena, which are distinct from the typical aurora, often occur together and may be caused by similar conditions at the edge of space.

Berkeley Physics

QUANTUM EXPERIMENT COLLABORATION

A distributed quantum network

The QUANT-NET consortium – Berkeley Lab (Berkeley, CA); University of California Berkeley (UC Berkeley, CA); Caltech (Pasadena, CA); and the University of Innsbruck (Austria) – seek to establish quantum networking to support and especially distribute quantum computing and sensing.



Berkeley Physics

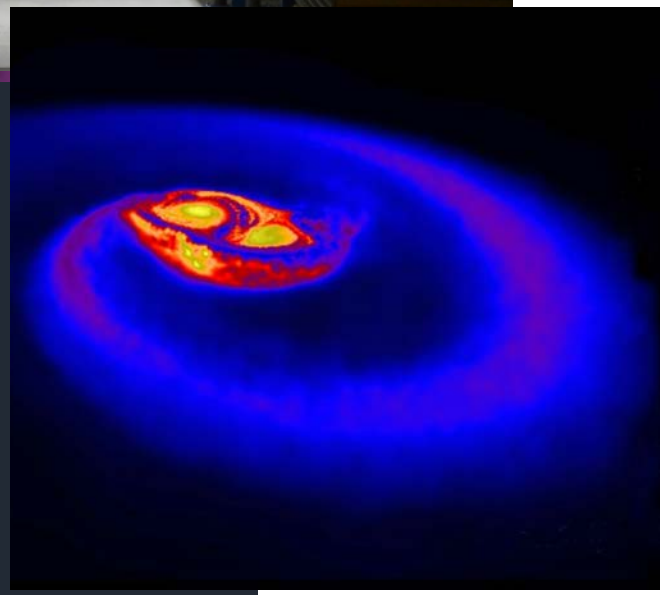
QUANT-NET

PARTICLE PHYSICS

The future of particle physics

A panel of the nation's top particle physicists (P5), chaired by UC Berkeley, theoretician Hitoshi Murayama, has issued its final report recommending how the U.S. government should commit its high-energy physics research funds for the next decade and beyond, focusing on neutrinos, dark matter and the cosmic microwave background.

Our Centers



NSF Physics Frontier Center (N3AS)

N3AS

Theory and computation for multi-messenger astrophysics

Science Mission

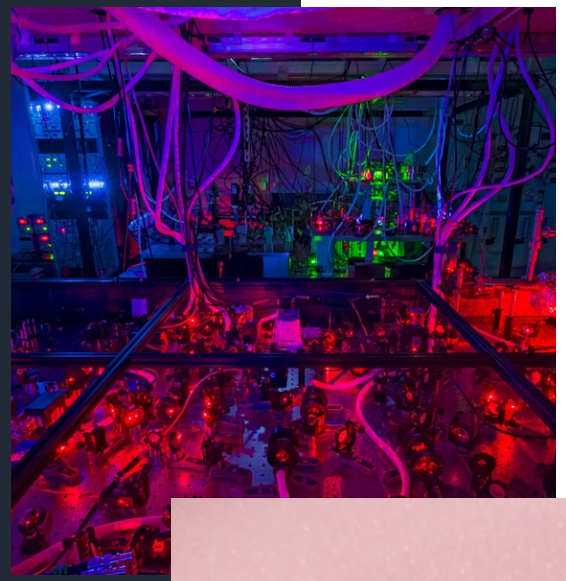
Neutrino physics and astrophysics, nuclear astrophysics topics ranging from supernova and neutron star modeling to dark matter, and fundamental symmetries.

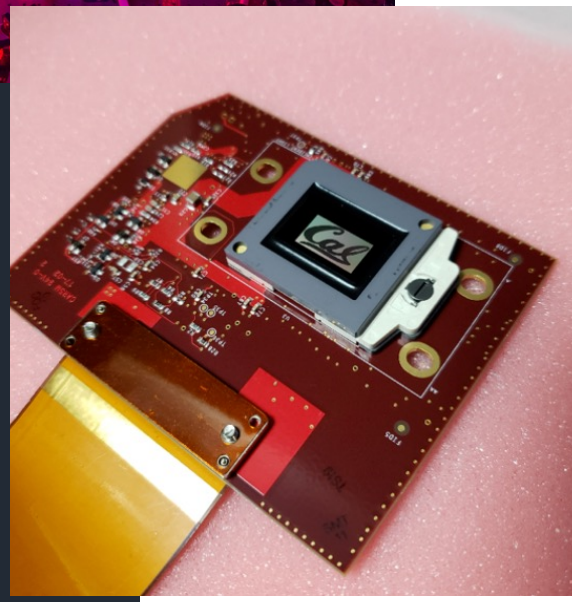
Research Foci

- Fundamental Symmetries
- Nucleosynthesis
- Dense Matter and Neutron Stars
- Dark Matter
- Astrophysical Simulations

Berkeley Physics

N3AS Network for Neutrinos, Nuclear Astrophysics, and Symmetries PHYSICS FRONTIER CENTER





Challenge Institute for Quantum Computation

CIQC

Fundamental challenges to the development of the quantum computer

Science Mission

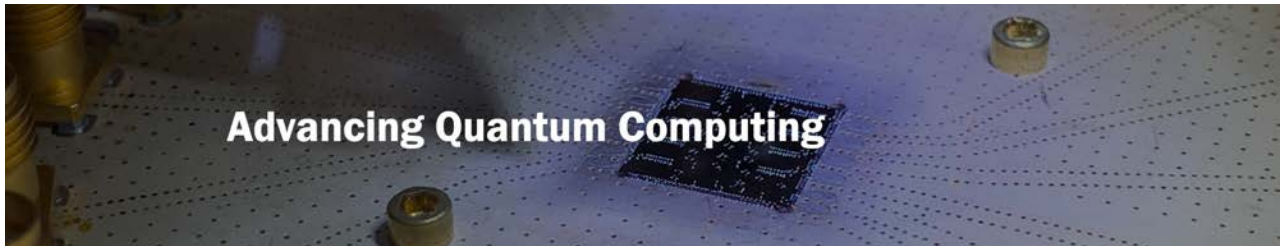
Bring together mathematicians, computer scientists, physicists, chemists and electrical engineers including graduate students and postdocs to address the fundamental challenges to the development of the quantum computer.

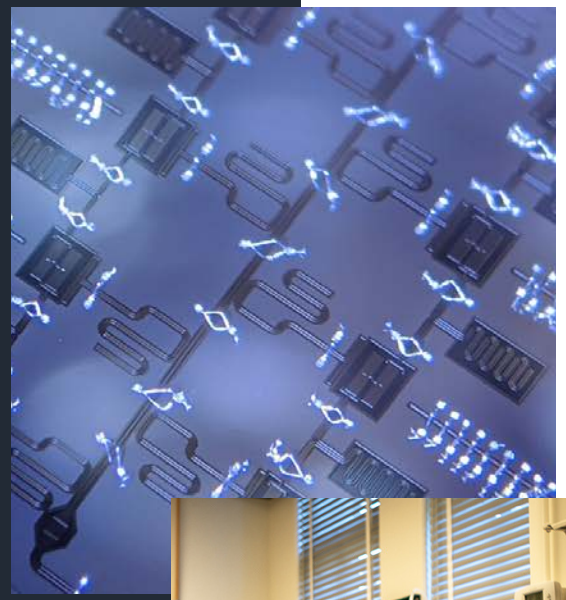
Research Foci

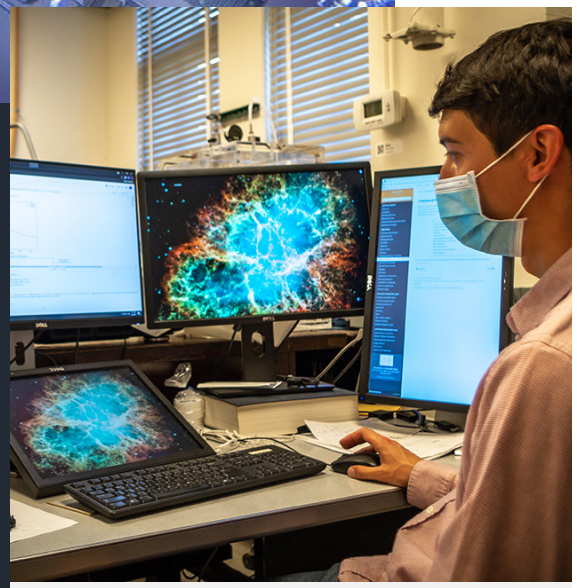
- Develop quantum algorithms and applications
- Develop the control of quantum computers
- Develop the hardware such as trapped atoms and ions

Berkeley Physics

CIQC NSF







AQT

Superconducting Quantum Computers for Science

Science Mission

The Advanced Quantum Testbed (AQT) is an advanced superconducting platform for full-stack quantum computing, fostering, deep collaborations with users selected through a competitive process.

Research Foci

- Quantum Processor Development
- Quantum Control
- Quantum Computation & Simulation

Berkeley Physics

AQT

U.S. DEPARTMENT OF ENERGY
Office of Science

BCTP

The most pressing scientific questions about the Universe.

Science Mission

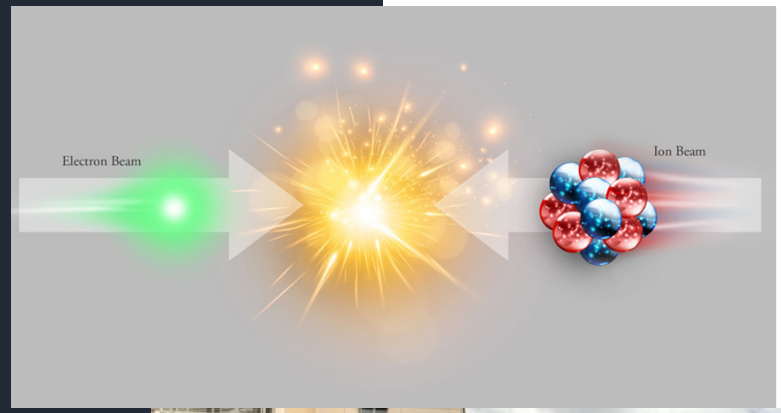
Furthering our understanding of matter, spacetime and the Universe, or more specifically quantum gravity, dark matter, neutrinos, the Higgs boson, and even the multiverse, …

Research Foci

- Particle Theory
- Particle Cosmology
- String Theory and Quantum Gravity

Berkeley Physics

UCEIC



UC-wide Center Focused on the Physics of the Electron Ion Collider (EIC)

Science Mission

The EIC will be a particle accelerator that collides electrons with protons and nuclei to produce snapshots of those particles' internal structure—like a CT scanner for atoms.

Research Foci

- How does the mass of protons and neutrons arise from the nearly massless quarks and gluons?
- How does the spin of the nucleon arise?
- What are the emergent properties of dense systems of gluons?

Berkeley Physics

BPIE - The Berkeley Physics International Education (BPIE) Program partners with universities around the world to provide undergraduate international students an opportunity to study abroad at UC Berkeley for one semester or one year.

BETA Physics - The Berkeley Experience and Training in Advanced Physics (BETA Physics) Program is a certificate non-degree program which hosts visiting students from around the country and the world to provide them with an opportunity to study advanced graduate level physics at UC Berkeley for one or two semesters.

The Berkeley Pre-Core Transfer Summer Program is designed specifically to help prospective and newly admitted transfer students strengthen their skills to transition successfully into physics, astrophysics, and earth and planetary science (EPS) majors at UC Berkeley.

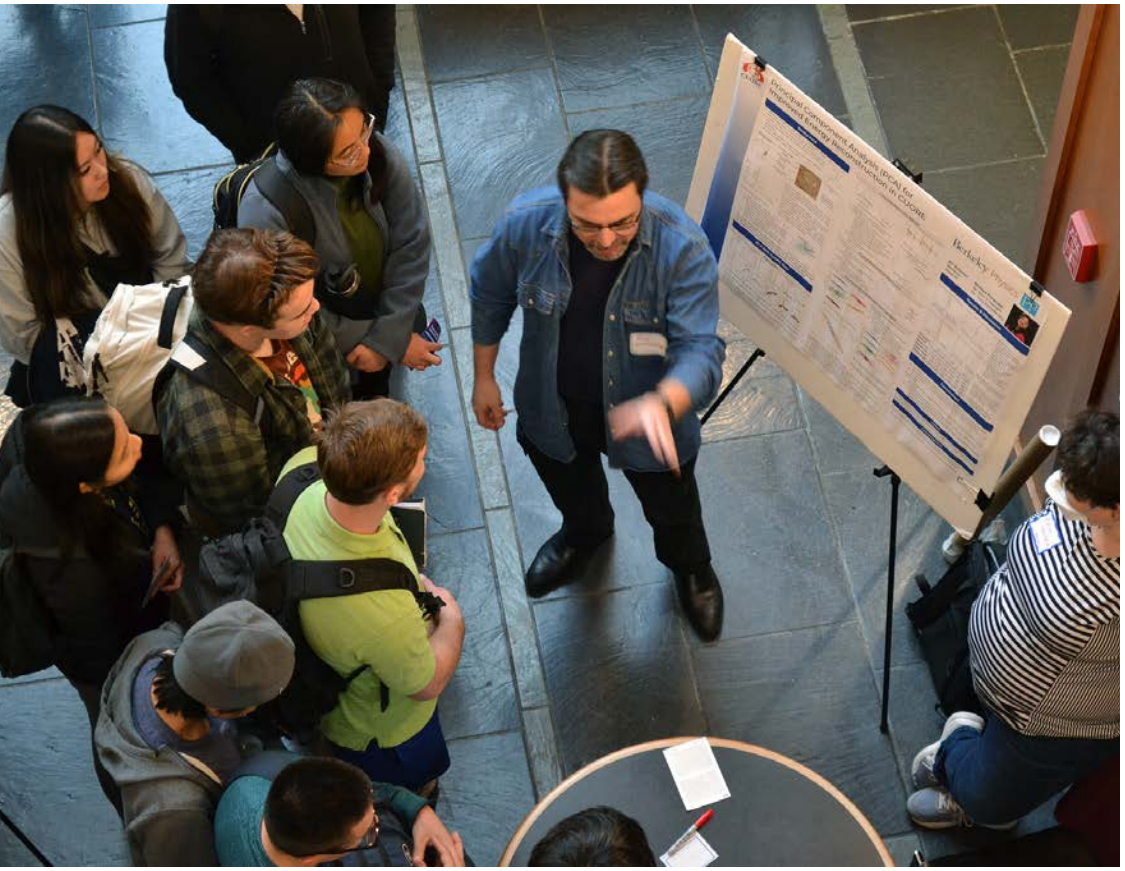
REYES - The Remote Experience for Young Engineers and Scientists (REYES) virtual STEM-H learning experience aims to increase science literacy, inspire and train the next generation of engineers and scientists. We also help increase diversity in STEM fields by lowering barriers of entry for all, including students from underrepresented backgrounds. To date, more than 11,000 learners in 135 countries have registered for REYES.

Berkeley Connect in Physics: The Berkeley Connect program opens up the extraordinary resources of the university to you: the extraordinary students on our campus. By joining, students will become part of a community of like-minded faculty, mentors, and students that will provide a supportive environment in which to exchange and discuss ideas and goals.

Pi2 - The Physics Innovators Initiative is our vision for modernizing, streamlining, and strengthening the path students follow as they pursue their undergraduate careers. The Pi2 Summer Scholars Program is designed to create funded summer research opportunities for undergraduates and rewards graduate students and postdocs for their mentorship.

BUILDING NEW BRIDGES

Every Student By Name And Need



NEW FOR FALL 2024

Expanded Physics Undergraduate Research Fair

- Expanded to Division-Wide in Fall 2024
- Took place at Pauley Ballroom on August 29th
- Co-sponsored by MPS Scholars
- Astro/Math/EPS/MPS Scholars and Pi2 were included

Our Community

Creating A Community Of Life-Long Learners

Faculty

Administrators

Scholars

Students

Berkeley Physics

LUCA ILIESIU

“My research focuses on understanding how gravitational objects, such as black holes, obey the rules of quantum mechanics. I am also interested in understanding the space of such theories using analytic and numerical constraints.”

Luca is a high-energy theorist interested in quantum field theory, quantum gravity, and their relation to particle and condensed matter physics. He recently received the Fundamental Science Award and the DOE Early Career Award.

Berkeley Physics

AZIZA SULEYMANZADE

“I enjoy finding creative ways to control new quantum degrees of freedom and generate exotic states of matter and light for quantum information technology and precision measurements.”

Aziza is an experimental physicist working with Rydberg atoms, superconducting circuits, and diamond nanophotonics. She developed a novel platform for transducing quantum information and demonstrated entanglement distribution between spin qubits over 40 km."

Berkeley Physics

HARRY LEVINE

“I am excited about developing new strategies to control quantum systems in the lab with ever-increasing scale and fidelity in order to use them as tools for science and technology.

Harry’s research is in experimental quantum science. He received the Deborah Jin Thesis Prize in 2022 for his work on neutral atom arrays.

Berkeley Physics

VICTORIA XU

“I’m interested in using precision measurements to more deeply understand and observe our Universe.”

Victoria works on precision experiments for fundamental physics. She was awarded the Hänsch Prize for “using quantum optics to fundamentally improve metrology… and advance gravitational wave detection.

Berkeley Physics

CHIARA SALEMI

“My research combines superconducting quantum sensors, classical electromagnetism, and high-energy magnets to search for axion dark matter.”

Chiara is an experimentalist who has developed new techniques to search for axion dark matter over orders of magnitude in mass, from neV to meV.

Berkeley Physics

1943
Adolph C. and Mary Sprague Miller entered into a trust with the Board of Regents to establish an institute "dedicated to the encouragement of creative thought and conduct of research and investigation in the field of pure science."

1953
Adolph Miller passes away.

1955
The Statement Establishing the Institute for Basic Research in Science was submitted to the Regents and was subsequently approved.

1957
Mary Sprague Miller passes away. The names of the donors became public and the Institute was designated: "The Adolph C. and Mary Sprague Miller Institute for Basic Research in Science."

Six professors were named the first Miller Research Professors:

James Carson, Jr., Chemistry

Jack Evernden, Geology & Geophysics

Daniel Mazia, Zoology

Jerzy Neyman, Statistics

William Nierenberg, Physics

Roger Stanier, Bacteriology

1958
1st Visiting Miller Professor is named:

Leopold Schmetterer, Statistics

1960
1st Miller Fellows are named:

John Fletcher, Physics

James Kinsey, Chemistry

Carl Sagan, Astronomy

Dana Scott, Mathematics

Charles Shuster, Bacteriology

Paul Whitfeld, Biochemistry

1997
Miller Institute establishes an annual Interdisciplinary Symposium

2005
The Miller Institute celebrates 50 years of science and establishes development campaign to provide for continued support of its programs.

celebrating 50 years

The Adolph C. and Mary Sprague
MILLER INSTITUTE
for Basic Research in Science | University of California Berkeley

The Miller Institute is "dedicated to the encouragement of creative thought and the conduct of research and investigation in the field of pure science and investigation in the field of applied science in so far as such research and investigation are deemed by the Advisory Board to offer a promising approach to fundamental problems."

Visiting Professors

Marina Filip,
University of Oxford

Vidya Madhavan,
University of Illinois at Urbana Champaign

Nicola Spaldin,
ETH Zurich

Fellows

Katherine Fraser,
American University of Beirut, Lebanon

Kate Reidy,
Trinity College, Dublin

Berkeley Physics

Faculty Awards

- **James Analytis** — Brown Investigator, Bakar Prize, L&S Faculty Award
- **Mina Aganagic** — Miller Professorship
- **Raphael Bousso** — Miller Professorship
- **Hernan Garcia** — L&S Faculty Award
- **Wick Haxton** — American Philosophical Society
- **Shimon Kolkowitz** — Moore Foundation Experimental Physics Investigators Initiative
- **Holger Müller** — Brown Investigator
- **Hitoshi Murayama** — Miller Senior Fellowship
- **Gabriel Orebi Gann** — ICFA Instrumentation Award (Italy)
- **Geoff Penington** — Sloan Fellow, APS George Valley Jr. Prize
- **R. Ramesh** — National Academy of Sciences
- **Urosh Seljak** — American Academy of Arts and Sciences
- **Irfan Siddiqi** — American Academy of Arts and Sciences
- **Feng Wang** — APS Frank Isakson Prize

MAVIS NJOO LAU
DIRECTOR OF FINANCE & OPPERATIONS

“The only constant in life is change” & “Be happy. Not because everything is good, but because you can see the good in everything.”

Brief Bio

Mavis Njoo-Lau joined UC Berkeley in October 2011 as a Research Administrator. Mavis was named Director of Finance in October 2018 and became the Administration and Finance Director in April 2022 at Berkeley Social Welfare. As an immigrant from Hong Kong, Mavis always believes in supporting higher education to provide support and opportunities for the growth of our future generations.

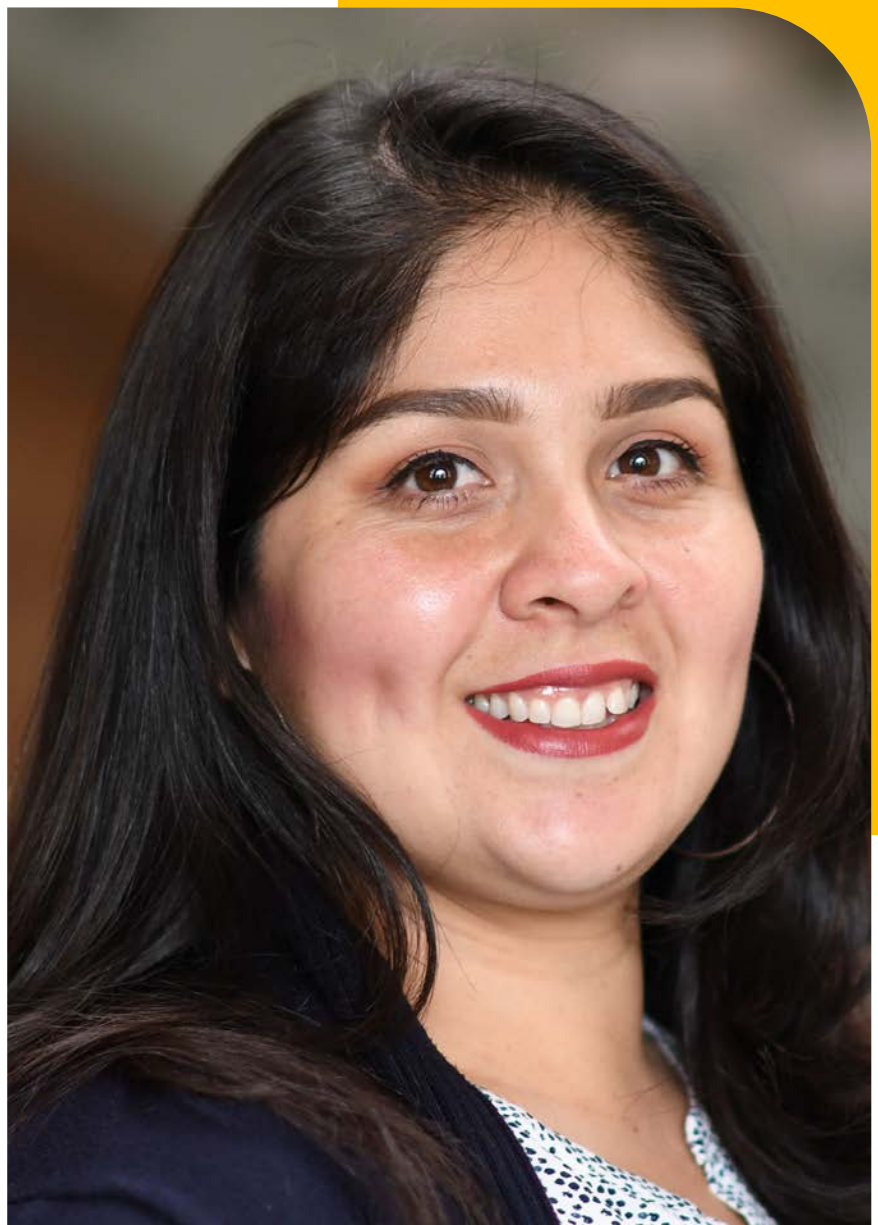
Strategic Area

Cultivate a Strong Community - Being the Director of finance and operations, I believe my job is to get involved, build relationships, actively listen to the needs of others, and work with faculties, staff, and students to support their goals. Together we can achieve great things and more.

Berkeley Physics

ARIANA CASTRO
LEAD GRADUATE ADVISOR

“The only way to do great work is to love what you do”-Steve Jobs



Brief Bio

Ariana Castro has been on campus for over 18 years working in graduate student services. Ariana enjoys working with students and supporting them throughout their academic journey at Berkeley. She likes spending time with family and hosting carne asadas on the weekends.

Strategic Area

Strengthening Equity and Inclusion. (As a student services professional I contribute to equity, and inclusion through my daily interactions with students, faculty, and staff. For me it's the little things that can make a lasting impact. I strive to cultivate a supportive environment in which all members of my community feel respected and heard.)

Berkeley Physics

NITIN SRIVASTAVA
UNDERGRADUATE ADVISOR

“Education is not preparation for life; education is life itself.”
— John Dewey

Brief Bio

Nitin joined the Berkeley Physics community as an academic advisor in February this year after working for nine years at Idaho State University. As a caring, student-centered practitioner, he brings his experience and skills in advising, mentoring, teaching, and curriculum development to serve in this position. His passion for Physics drives his work, and he feels blessed to have an incredible and devoted team of our physics staff and faculty

Strategic Area

I will focus on student transition, success, and persistence, emphasizing integrity and fostering a diverse and inclusive environment for all students. As a new academic advisor, I will also focus on building and maintaining relationships with other academic units as I work with them to improve the quality of students' experiences throughout their journey.

Berkeley Physics

Berkeley People & Culture

- **Collaboration** - Enhances individual work by soliciting contributions from others and enhances others' work by contributing to their success to more effectively meet unit goals.
- **Goal Accomplishment** - Achieves individual goals that contribute to unit priorities.
- **Inclusion & Belonging** – Demonstrates respect for people and their differences, and understands the benefits of a diverse workforce, is trusted and respected by others, includes and welcomes others, and works to understand the perspective of others.
- **Innovation** - Uses knowledge, skills, and professional experience to seek efficiencies and improve work outcomes.
- **Job Mastery** - Demonstrates the knowledge, skills, and abilities that result in high performance and contributions within the scope of the employee's job description.

STAFF RECOGNITION

SPOT Awards

Amin Jazaeri
Carlos Bustamante
Claudia Trujillo
Mari Royer
Kathleen Cooney
Marjani Jones
Espe Munoz-Riddle
Stephen Pride-Raffel
Elizabeth Nakahama Ryan
Extra Mile
Austin Hedeman
Alex Perry

Where Students Are Achievers

Graduate Student Incoming Class

Aldas, Dhruv
Bac, Adam
Benkirane, Yacine
Brandani, Enzo Daniele
Esparza, Jose
Ferguson, Keaton Muir
Flather, Amy
Gadamsetty, Srikar Somu
Giner Olavarrieta, Santiago Ricarte
Gray, Katie Bridget
Greiveldinger, Anousha
Gusarov, Nikolay
Iwasaki, Yuno
Liao, Yu-Shuo
Lin, Ke
Loewe, Robert Kwongsun
Mo, Siqi
Mohammadi, Amir Shapour
Parker, Liam Holden
Poe, Cameron
Pol, Bianca Julia
Puranam, Shreya Venkatanaga
Raphael, Dylan Joseph
Reynolds, Samuel Judah
Rydstrom, Ivar
Sangare, Aurelie Gunilla Louise
Selub, Nathaniel
Smith, Andrew
Stefanov, Nikolai
Steinfeld, Samara
Stoeltzel, Anke
Sun, Andrew
Sun, Danny
Sun, Dingyi
Takach, Joey Sandor
Temkin, Vlad
Tosolini, Anna Sloan Lear
Truong, Jannik
Urdahl, William
Urek, Rana
Waghmare, Amogh Yogesh
Wen, Kevin Chenxiao
Wong, Jason
Xiao, Brian Lee
Xiao, Tian
Xu, Clara Yilin
Xu, Jianjie
Yu, Eric

Berkeley Physics

Meet the new graduate class

- **1192 Applicants; 44 acceptances**
- **6 Major Fields of Physics**
- **Applicants from Across the Globe**

		Applied	Accepted
Research Type	Experiment	625	23
	Theory	556	21
Concentration	AMO	178	2
	Astrophysics	145	7
	Biophysics	30	3
	CM	352	9
	HEP	302	15
	Nuclear	51	3

A Community Of Researchers

Incoming Postdoctoral Scholars

Antonini, Stefano
Baleato Lizancos, Anton
Bloch, Itai
Boccioli, Luca
Borgnia, Dan S
Chand, Saroj
Chen, Sudi
Chen, Youzhe
Choi, Young Woo
Christensen, Andrew
Dai, Zhehao
Dhankher, Preeti
Dresselhaus, Elizabeth Jayne
Du, Lipei
Ehlers, Raymond James
Espino, Pedro Luis
Fan, Ruihua
Froustey, Julien
Gagnon, Louis-Guillaume
Gamba, Rossella
Garratt, Samuel Joshua
Giles-Donovan, Nathan
Glikin, Neil G
Hansen, Erin
Jonas, Florian
Kaptanoglu, Tanner
Kim, Minjung
Korwar, Mrunal Prashant
Lee, Jong Yeon
Li, Mengke
Li, Zack
Liu, Chunxiao
Maisenbacher, Lothar Stefan
Mangu, Aashrita
Mehta, Smriti
Nair, Sujay
Olcina Samblas, Ibles
Outmezguine, Nadav Joseph
Papaj, Michal
Pefkou, Dimitra Anastasia
Perego, Elia
Pitik, Tetyana

A Community Of Researchers

Incoming Postdoctoral Scholars

Ranganathan, Aditya
Rath, Pratik
Rule, Evan Johnson
Saad, Philip
Savoray, Inbar Ada
Schneider, Lucas
Shahbazi Moghaddam, Arvin
Shaidu, Yusuf
Skrzypek, Barbara
Stromberger, Peter
Suliga, Anna M
Sunko, Veronika
Trishin, Sergey
Valcin, David
Van Kan, Adrian
Varni, Carlo
Waechtler, Christopher Wayne
Wamorkar, Tanvi
Wu, Yantao
Xu, Weishuang Linda
Yadav, Neha
Yamazaki, Tomohiro
Yan, Zhenjie
Yeo, Beomki
Zhao, Tianqi
Zhao, Wenbin
Zhou, Dake

Starting August/September

Baiyi, Yu
Gao, Qiang
Mayer, Daniel
Olumakindee, Ogunnaike
Pan, Grace
Richardson, Thomas
Yao, Shunyu

EQUITY AND INCLUSION

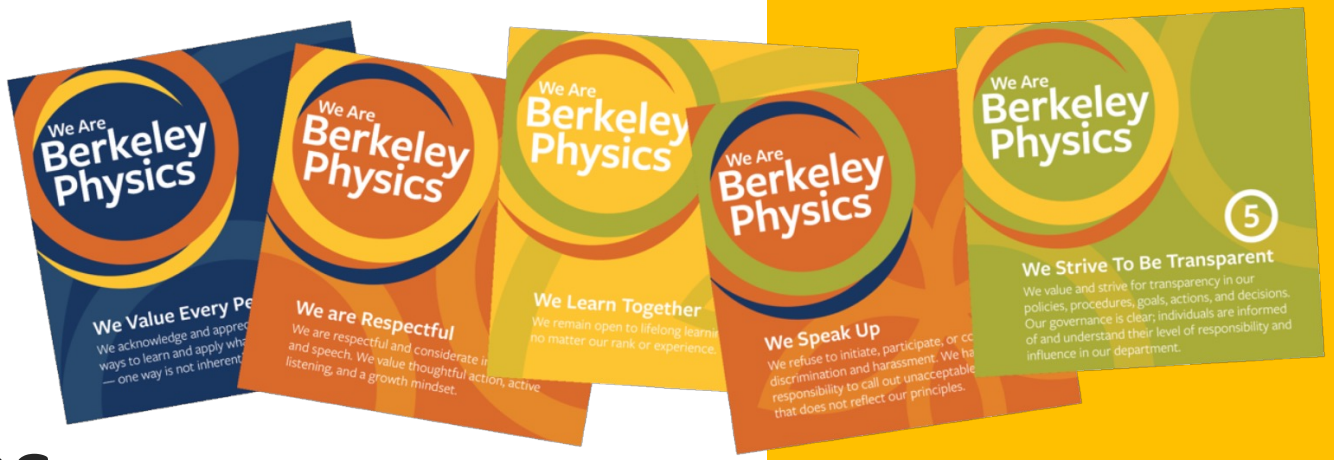
Building A Welcoming & Vibrant Community

- Fall Department-wide discussion will review strategic plan
- Faculty committee plans back-to-school reception in September
- Increased training and support to undergraduate leaders
- Faculty retreat and staff committee events will address climate

Berkeley Physics

EQUITY & INCLUSION

Physics Department Community Principles Handbook



A process was started during the Physics First Friday workshop in November 2020 to create a set of unique principles for the Physics Department, a set of agreements rooted in our own community values, beliefs and interests.

Berkeley Physics

STUDENT LIFE

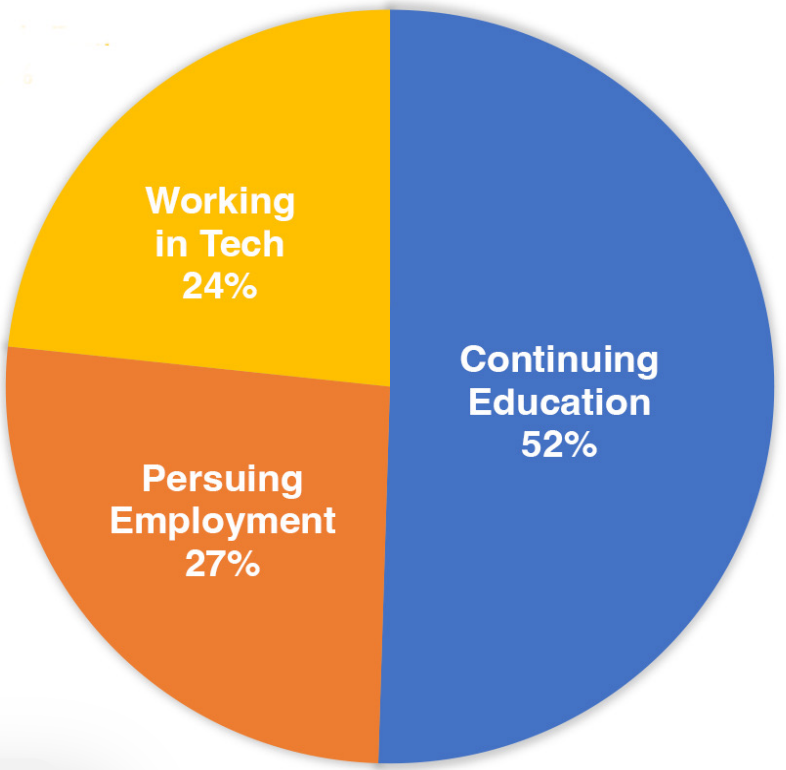
Physics Student Organizations

Student Organization activities include: mentoring, social events, faculty/student lunches, community outreach, BBQs, study halls, guest speakers, undergraduate student seminars, physics tournaments, workshops, research lecture series, poster sessions, research support,…

A Vibrant Community

AFTER GRADUATION

Our Undergraduate Class



'23-24 AY: 110 Graduates

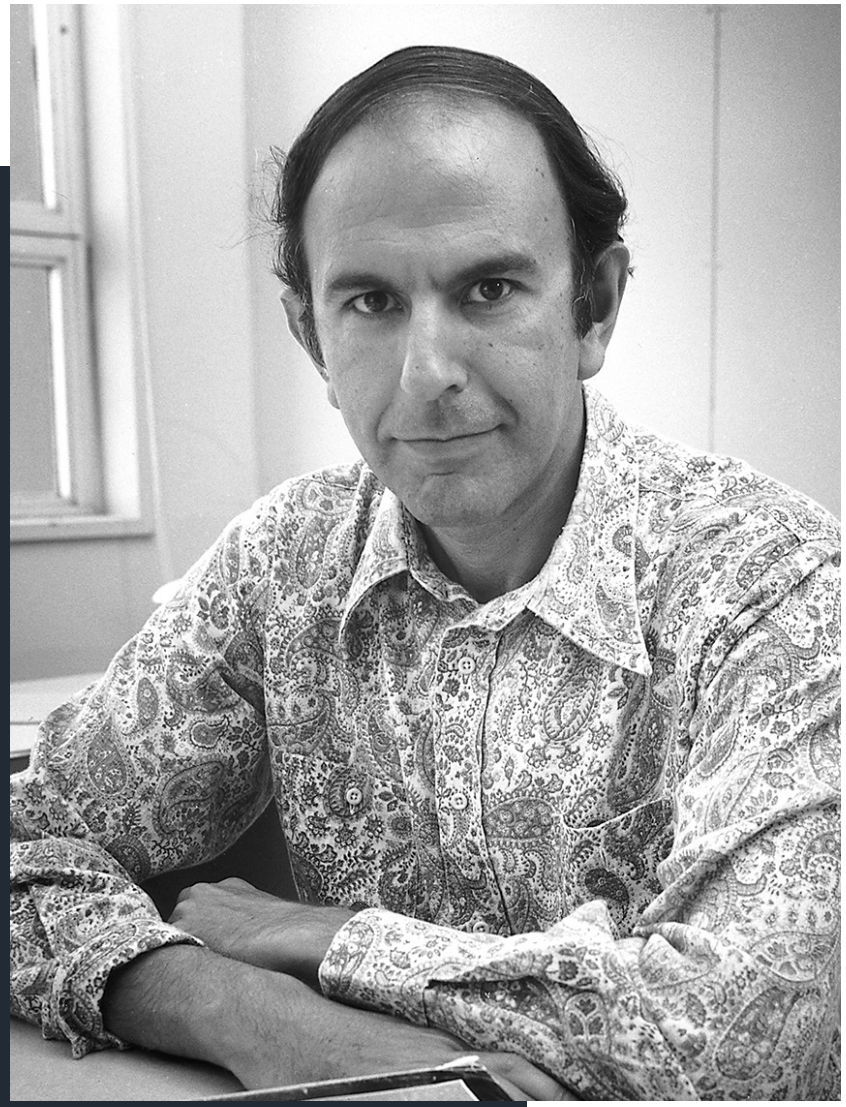
- research assistant/specialist
- software engineer or STEM teacher
- data scientist
- quantitative analyst
- quantum device test engineer

Berkeley Physics

Faculty Retirements

Wick Haxton

Berkeley Physics



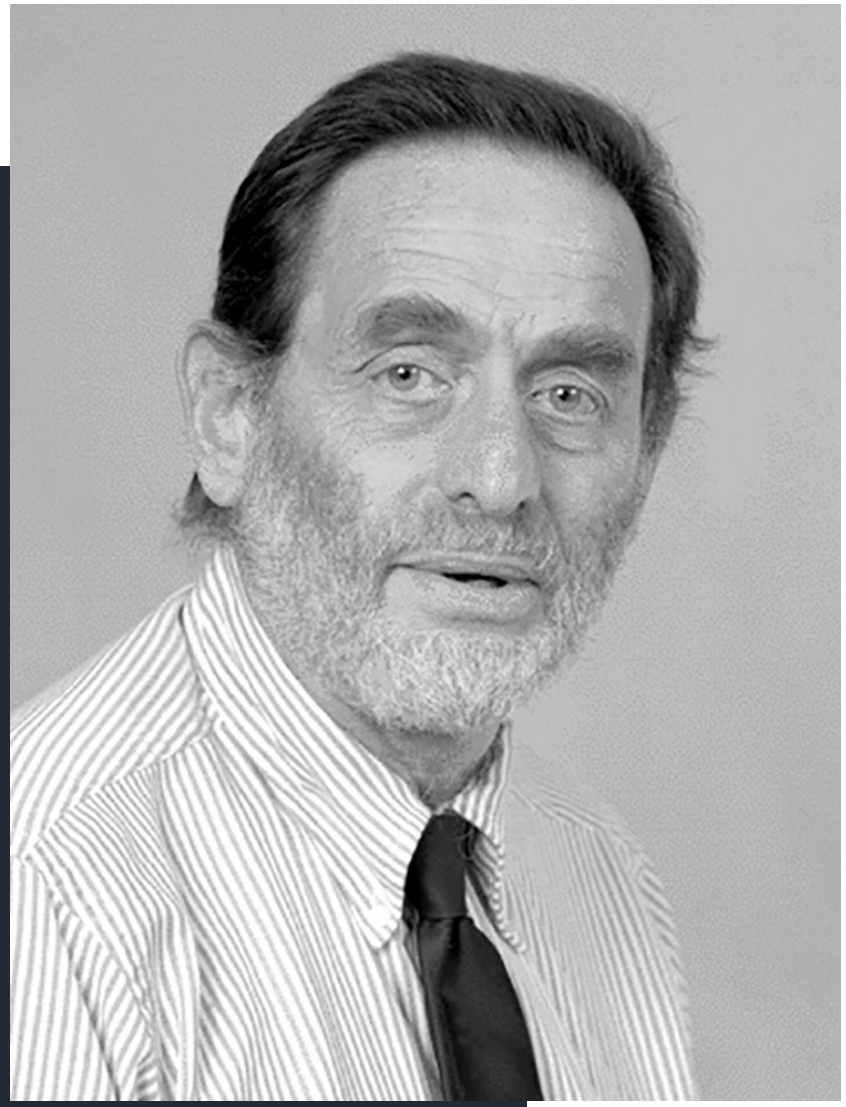
IN MEMORIAM

Remembering Korkut Bardakci

Korkut Bardakci, Professor of Physics at UC Berkeley, passed away on March 16, 2024, in Oakland California. He was 87.

Professor Bardakci made seminal contributions to Quantum Chromodynamics and String Theory. Together with his colleague and friend Martin B. Halpern, Prof. Bardakci discovered a new type of mathematical structure within String Theory, Affine Lie Algebras, which enjoyed far reaching applications.

Berkeley Physics



IN MEMORIAM

Remembering Rainer Sachs

Rainer “Ray” Sachs passed away in April 2024, very much missed by his family and his many colleagues and friends.

Sachs spent the majority of his career, from 1969 onwards, as a Professor of Mathematics and Physics at UC Berkeley. Unusually, he had two very distinct careers in science, both very successful, the first in general relativity and cosmology, and the second in the mathematics of radiation biology and carcinogenesis.

Berkeley Physics

Looking forward to 2024-25

NEW FOR FALL 2024

The Physics Innovation Lab

Nextgen Teaching and Research Facilities

- Will be completed Fall 2024
- Up-to-date tools for automated processing and computer-aided design, 3D printing, laser cutters, soldering circuitry stations
- Offers experience for undergrad students with no research or experimental background

Berkeley Physics

NEW FOR FALL 2024

The Graduate Program Review Task Force (GPRTF)

The Graduate Program Review Task Force (GPRTF) is underway in Fall 2024 with the aim of assessing and enhancing our graduate curriculum, to include looking at course content, testing structures and rubric. Chair Siddiqi is leading the effort with participation from graduate students.

Berkeley Physics

2024 EMILIO SEGRE LECTURE

Magic Angle Graphene: the Twist and Shout of Quantum Materials

Join us on October 28 at 5:30pm at the International House!

Professor Pablo Jarillo-Herrero of MIT will present the 2024 Emilio Segrè Lecture. In this talk he will review the discovery and physics of graphene and explain the principles and beauty of moiré materials. He will also provide a broad outlook of some exciting new directions and practical applications of this emerging field.

Berkeley Physics

Our Leadership Team

Dan McKinsey

Faculty Affairs, Vice Chair

Yury Kolomensky

Instruction, Vice Chair

Heather Gray

Instruction, Assoc. Vice Chair

Our Leadership Team

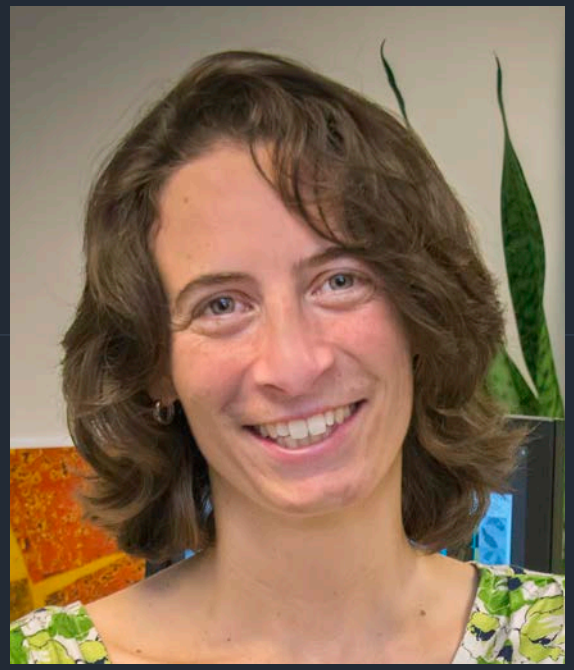
Martin White

Faculty Appointments
Co-Vice Chair

Shimon Kolkowitz

Faculty Appointments
Co-Vice Chair

Our Head Advisors

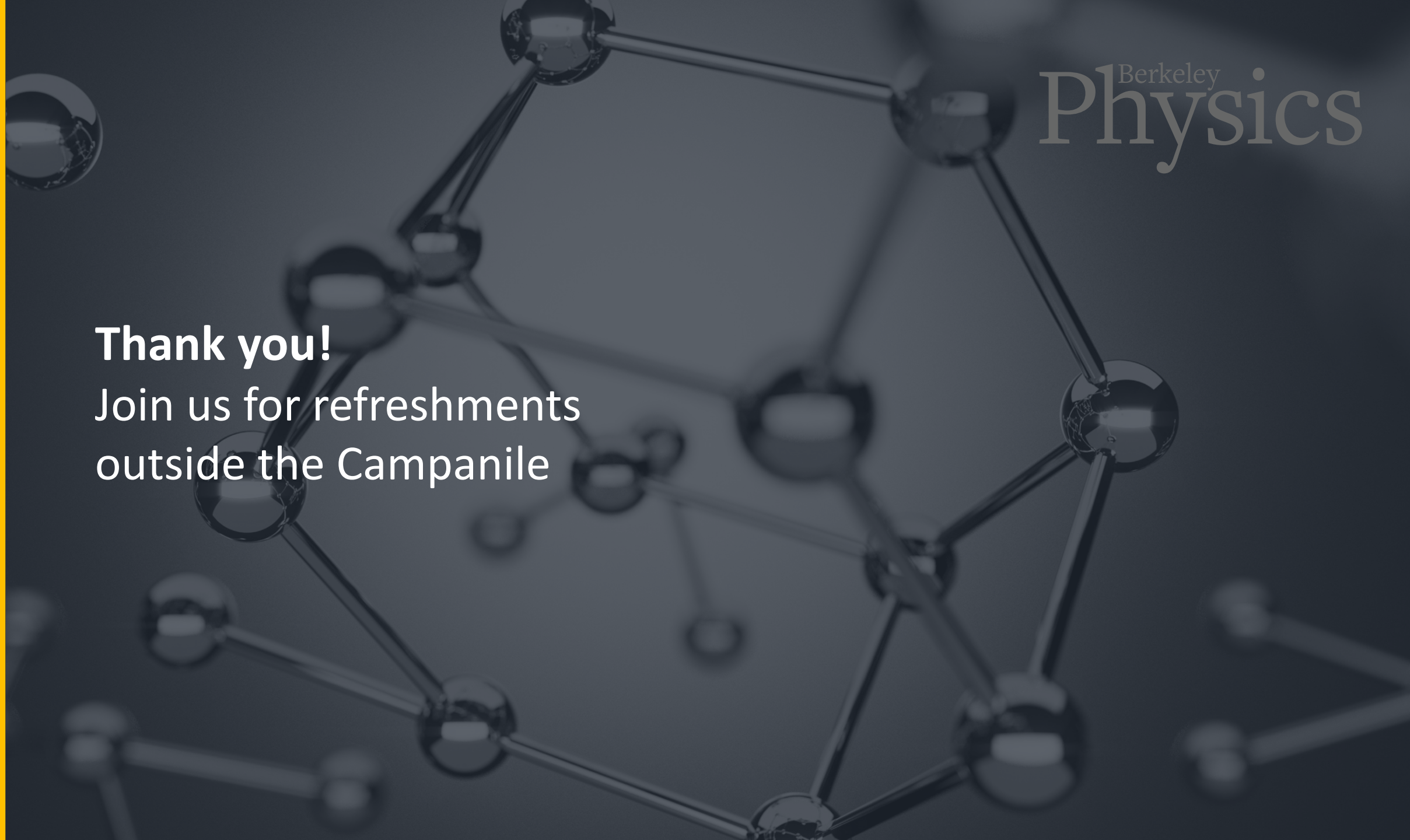


Naomi Ginsberg
New Co-Head Undergrad Advisor
(Na Ji stepped away)

Gabriel Orebi-Gann
Co-Head Undergrad Advisor

Dan Kasen
Head Grad Advisor

Holger Mueller
Head GSI Advisor



Thank you!

Join us for refreshments
outside the Campanile