ASTR/PHYS
PROFESSIONAL
DEVELOPMENT

Join APS and Physics alumni for a discussion on

Careers in Startups

Four alumni will share their entrepreneurial experiences following graduation from APS and Physics!

5:00 - 6:00 pm
Wed April 9
Duane G130

Careers in Industry & Aerospace
Wed April 3, 2024, 5-6pm

Opening remarks: Nick Schneider & Mike Dubson

Panelists

- Louis Rubbo
- David Goldberger
- Mckenna Partridge, formerly Fabrication Engineer at ColdQuanta

APS/PHYS Professional Development
Nick.Schneider@lasp.colorado.edu, Michael.Dubson@colorado.edu

https://www.colorado.edu/aps/undergraduate-studies/professional-development

Professional Development

APS/PHYS Professional Development is a resource for undergrads in fields related to physics and astronomy at CU Boulder. This website includes resources and information designed to help undergraduates in APS/Physics develop successful long term careers. This website is designed to offer resources and advice that will help you succeed in your career after graduating CU Boulder. Navigate with the following main sections:

Upcoming Events:

9 April, Careers in Startups (5-6PM in Duane G130)

23 April, Applying for Jobs (5-6PM in Duane G130)

Events for the 2024-2025 Academic Year:

19 March, Careers in Industry, Aerospace: slides, recording

5 March, Careers in Education and Outreach: slides, recording

12 February, Careers in Telescopes, Optics and Observatories: slides, recording

Upcoming ASTR/PHYS Professional Development Events

All in G130, 5-6pm, Wednesdays – with pizza!

- Wed 23 April, 5pm: Applying for Jobs

ASTR/PHYS students: read your weekly emails!
Everyone: check our departmental websites:
https://www.colorado.edu/aps
https://www.colorado.edu/physics

My Career Path

David Goldberger

CU Physics/Astronomy

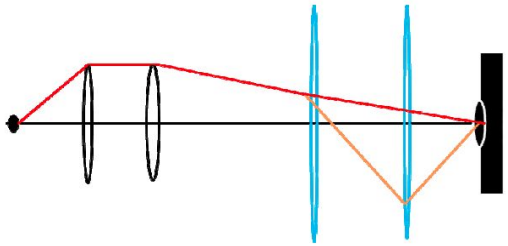
April 9th 2025

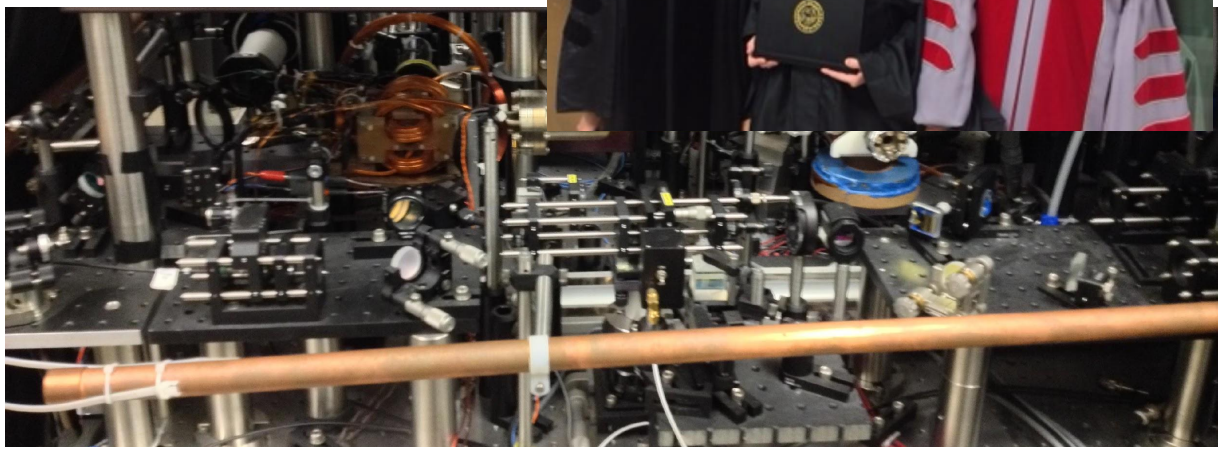
CU Physics and Theater 2015

LETTERS
PUBLISHED ONLINE: 12 JANUARY 2014 | DOI: 10.1038/NPHYS2850
nature physics

Universal dynamics of a degenerate unitary Bose gas

P. Makotyn, C. E. Klauss, D. L. Goldberger, E. A. Cornell* and D. S. Jin*





Fisher Investments 2015-2016


IRA & ESA Distribution Request Form

charles SCHWAB

FISHER INVESTMENTS®

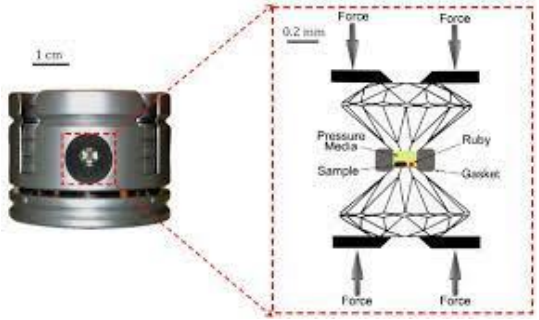
MS in Physics at UNLV 2017-2018

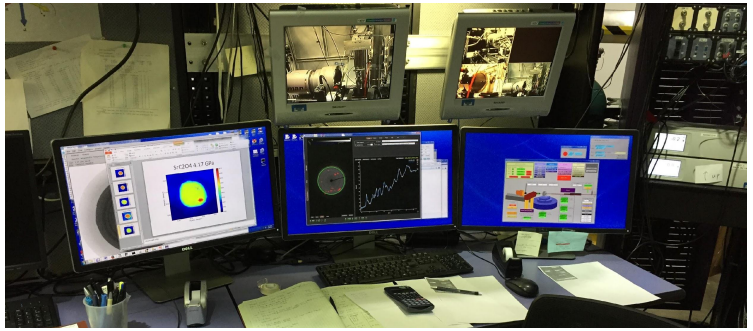
UNLV / HiPSEC

University of Nevada Las Vegas

A DOE/NNSA Center of Excellence

High Pressure Science & Engineering Center





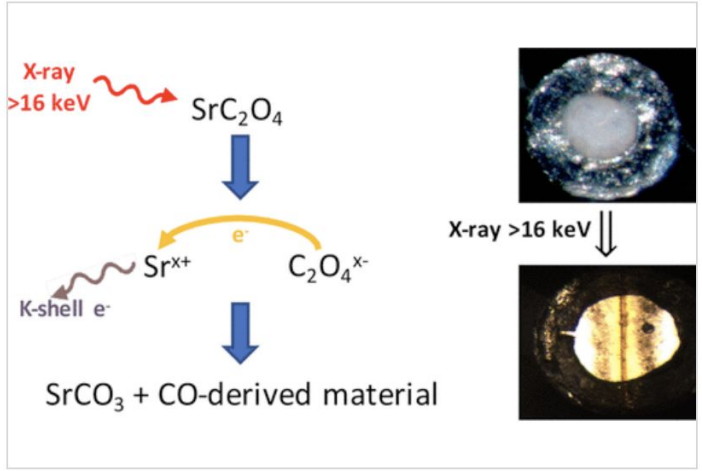
The Journal of Physical Chemistry A > Vol 121/Issue 38 > Article

Cite Share Jump to Expand

ARTICLE | September 5, 2017

Measurement of the Energy and High-Pressure Dependence of X-ray-Induced Decomposition of Crystalline Strontium Oxalate

David Goldberger†, Egor Evlyukhin†, Petrika Cifligu†, Yonggang Wang‡, and Michael Pravica*†

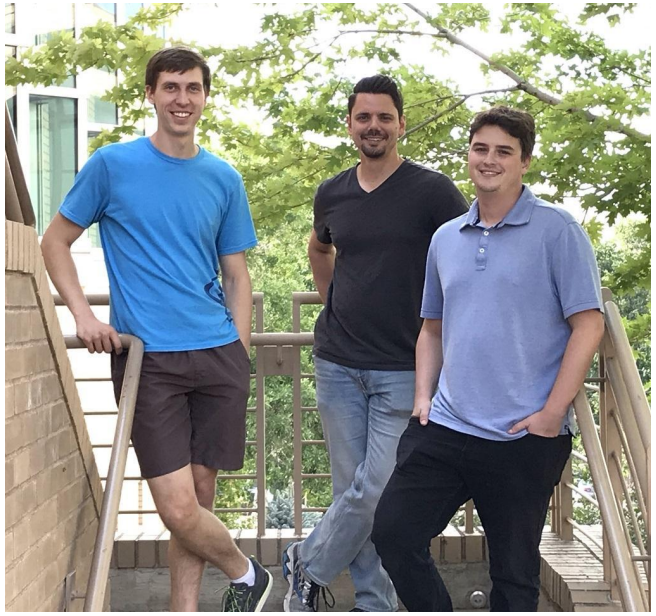


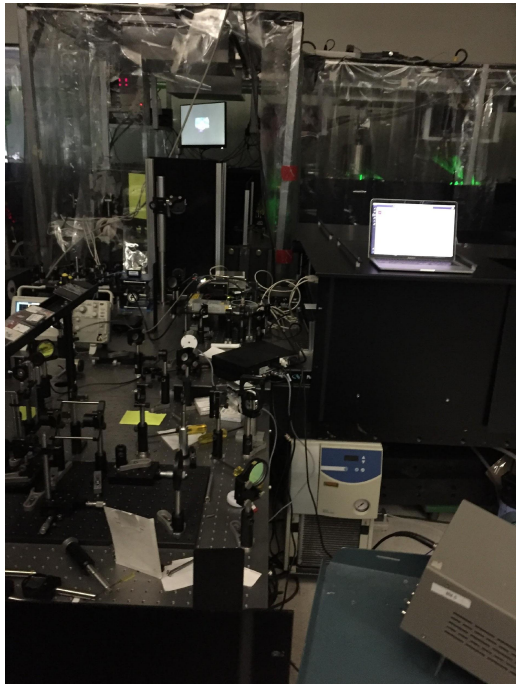
PhD in Physics CSM 2019-2023

Dear Mr. David L. Goldberger:

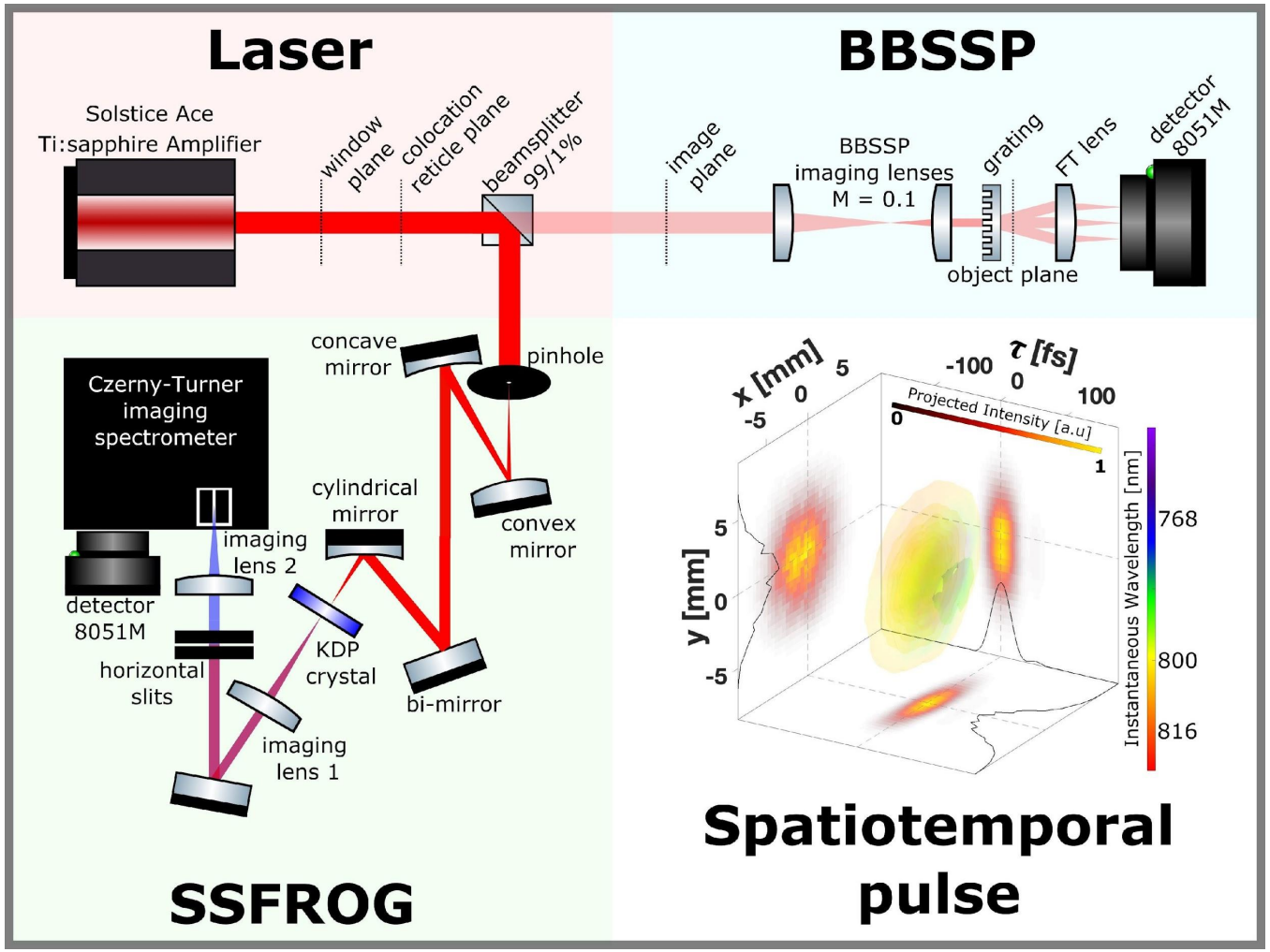
Thank you for your recent application to the University of Colorado **Boulder**.

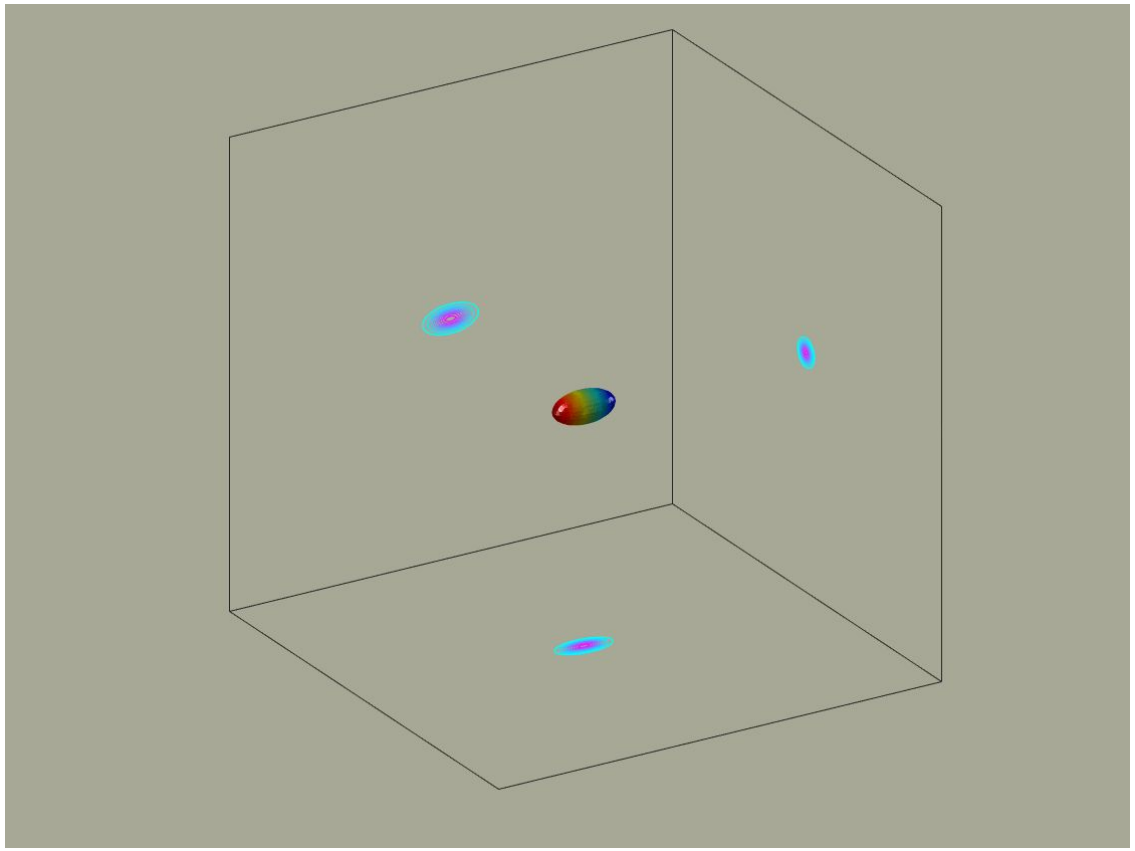
We are sorry to inform you that you have not been granted admission to the Physics - PhD program for the Fall 2019 term.



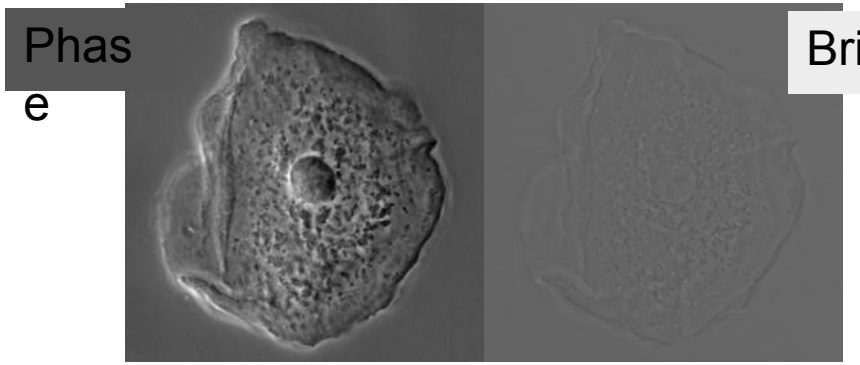


High-dimensional, multiplexed, single-shot ptychography for spatiotemporal ultrafast pulsebeam characterization



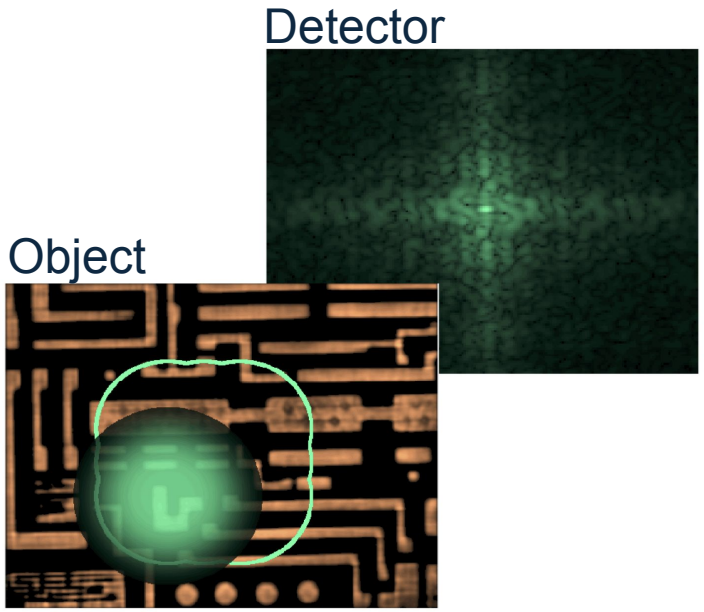


Ptychography

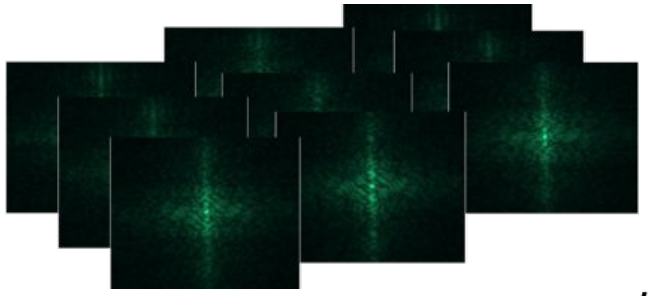


http://calculatedimages.blogspot.com/2014/04/cheeky.html

$$\psi_j(\boldsymbol{r}) = P(\boldsymbol{r})\, O(\boldsymbol{r} - \boldsymbol{r}_j)$$



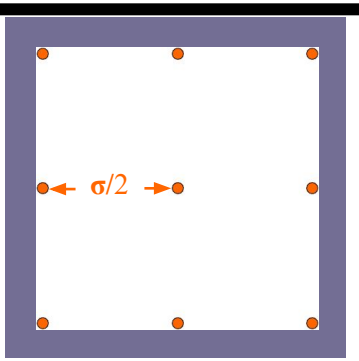
Appl. Phys. Lett., **85**, 4795–4797, 2004
Ultramicroscopy, **109**, 1256–62, 2009



Diffraction Data

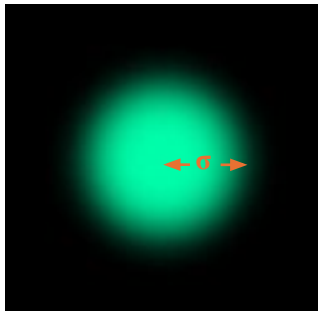
INPUT

$$\psi'_j = \Im^{-1}\left\{\frac{\Im\{\psi_j\}\sqrt{I_j}}{|\Im\{\psi_j\}|}\right\}$$



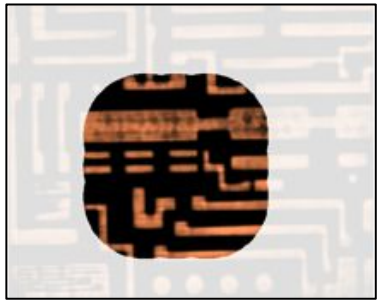
Scan Positions

Algorithm



Beam

OUTPUT

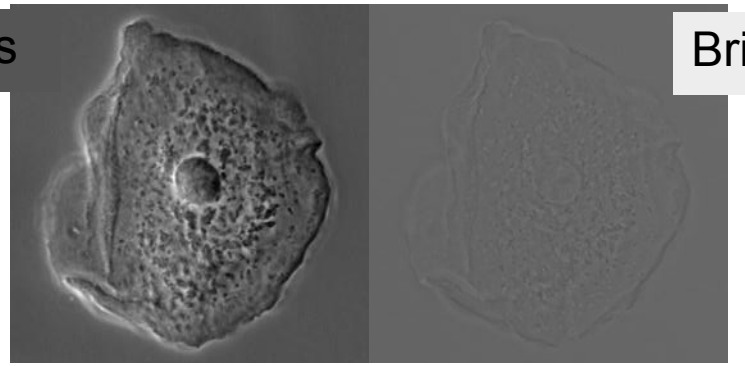


Complex Object

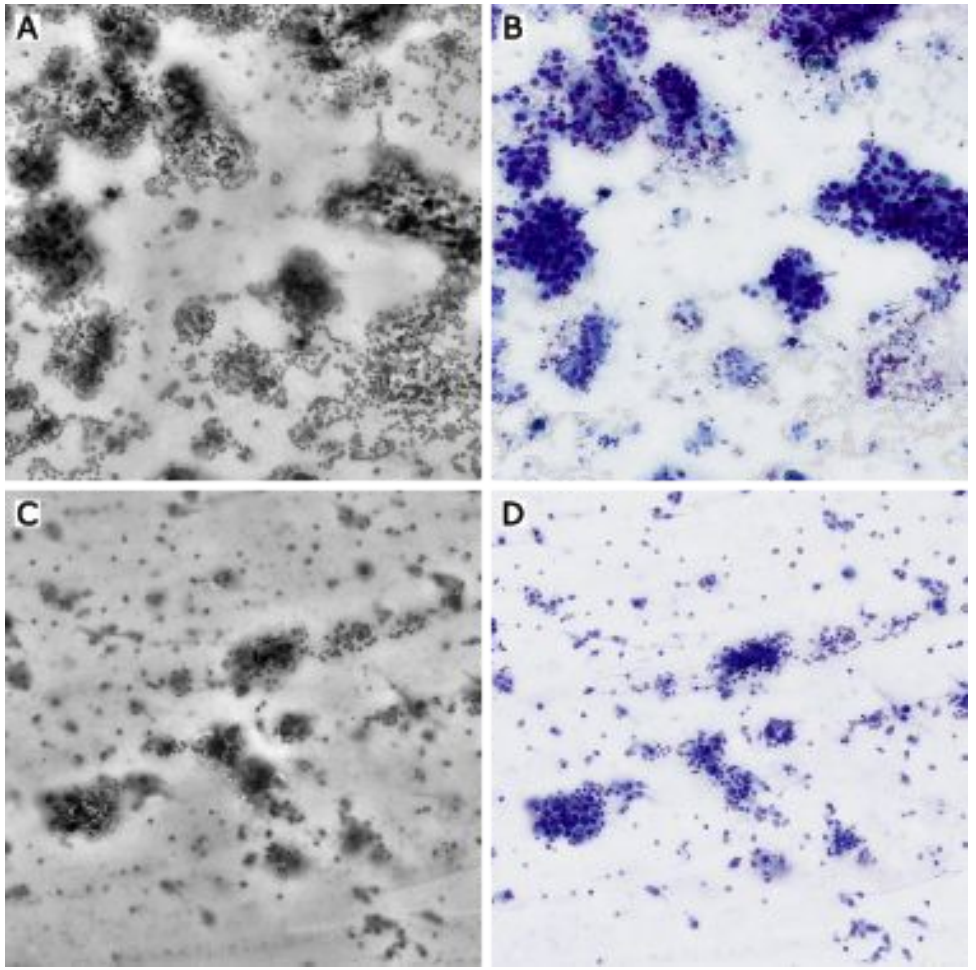
Pathware 2023-Present

Phase

Bright Field

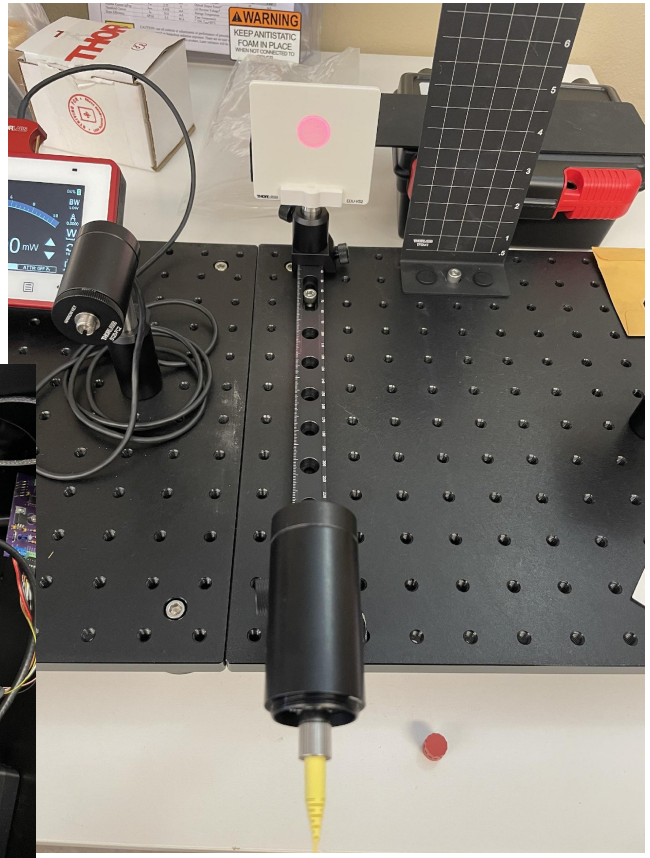


http://calculatedimages.blogspot.com/2014/04/cheeky.html

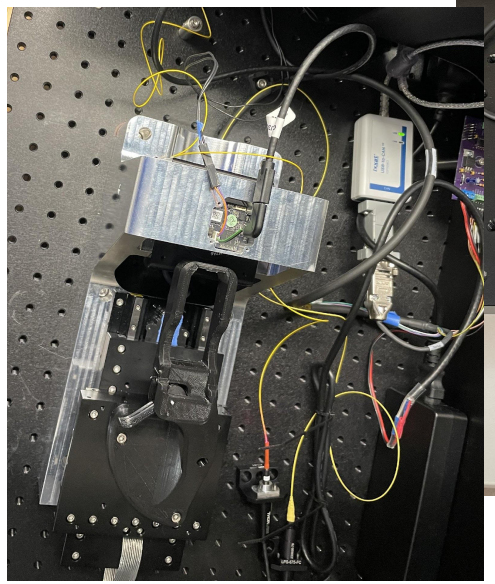


Pathware Projects

MATLAB



NIH National Institutes of Health
Turning Discovery Into Health



Some Lessons

- Find your ikigai
- It’s ok to put personal life over career – find balance
- “soft skills” really matter
- Network – just say hello (it’s not easy)
- Take ownership
- For Grad school the advisor/lab fit is most important
- You get what you give in Grad school
- Learn how to learn, and how to teach yourself
- Nothing is certain, there’s always risk

Mckenna Partridge

A bit about me + my time at CU

- Majored in Applied Math and Engineering Physics
  (Almost minored in Russian Studies)
- Graduated Dec. 2021
- Worked at Infleqtion (dba ColdQuanta) from June ‘22 - Feb. ‘24
- Took time off to rest, travel, and did a few months of substitute teaching
- Started working at Electro Magnetic Applications, Inc. Mar. ‘25

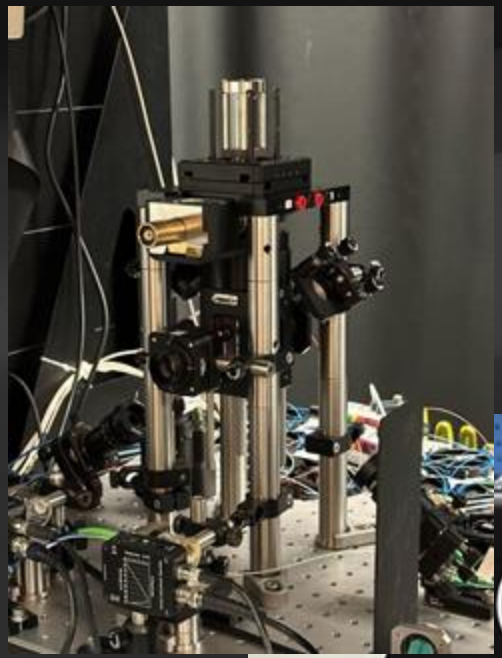
While in school:

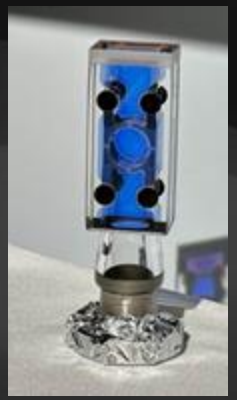
- Joined the Learning Assistant program
- Started research with Prof. Betterton in computational biophysics but stopped during covid
- CA/TA’d for a wide range of courses over 5 semesters
- Took a couple summers off (taking time off can be really healthy!)

Mckenna Partridge

Fabrication Engineer, Infleqtion

- I built the ‘cores’ of their quantum computer, though what I really learned was very low volume, complex manufacturing
- I had to learn many specific skills fast and wore many hats to help keep our team running well
- Used Python, SolidWorks, learned how to operate and troubleshoot new instrumentation, lots of hands on work with optics
- Did some management, got to go on a service visit to JPL

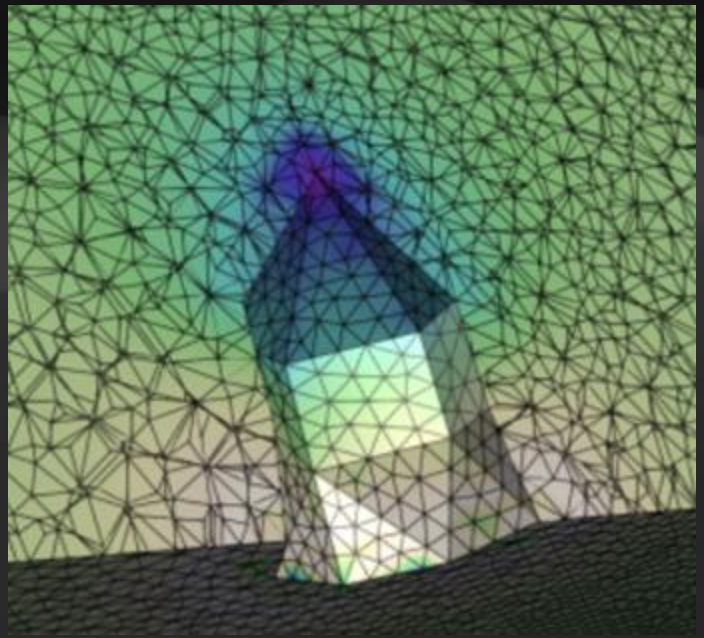




Mckenna Partridge

Scientist, EMA

- Running simulations solving a wide range of electromagnetic problems
- Two main simulation solvers (EMC Plus and EMC Charge)
- Python scripting, data analysis, eventually code base development
- Working on a wide range of projects, varying from internal development to government contracts to consumer electronics



Mckenna Partridge

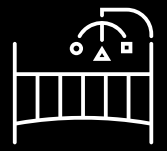
Advice and personal learnings:

- Socialize with your peers and your professors! You never know what doors people can help you get though (and later on, who you can help!). This is how I got hired at Infleqtion
- The physics program taught me great methodology for how to work, think, and solve complex problems which has proven more important than the specifics of the material taught
- A job is different than going to school: and it's okay if your first job is hard! I did great in school, enjoyed research and grading, and still found the transition difficult. I can't think of a way to 'prepare' other than just doing it. Just be nice to yourself while you acclimate to the professional world
- Enjoy being a student!

Louis Rubbo

Physicist at Zero Carbon Systems

Background



Born in Bozeman, Montana on August 26th, 2000

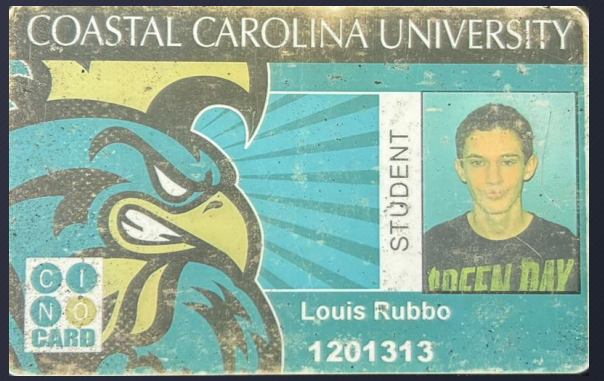
Briefly lived in State College, PA when my father was doing his post-doc

Grew up primarily in Myrtle Beach, South Carolina

High School

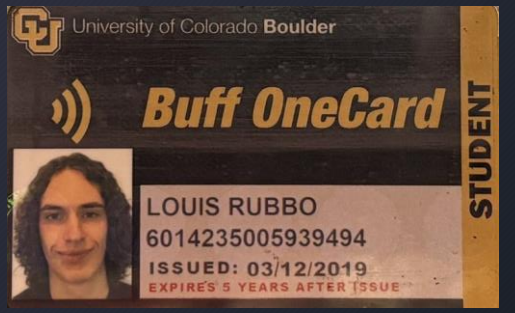
- **Scholars Academy 2014-2018**
  - Located on Coastal Carolina's Campus
  - Magnet School-type setup
- **Coastal Carolina University 2014-2018**
  - Focused Primarily on Music and Humanities classes

- Originally planned to go to NYU to be a professional musician



CU Boulder

- Majored in Physics and minored in Mathematics 2018-2022
  - Highly recommend Phys 3050 “Writing in Physics” and Math 4820 “History of Mathematical Ideas”
- Took and subsequently taught Phys 1400 through PISEC
- Studied Physics Education with Dr. Finkelstein my senior year of college



- **Worked for Pace Analytical in Ashville, NC 2022-2024**

- Started as an Analytical Chemist working on ICP-OES and ICP-MS method development.

- Transferred over to the QA/QC department in 2023
  - Writing SOP's
  - Performing Internal Audits
  - Maintaining Accreditation in Relevant States
  - Handling EPA and Client Audits

excelitas®

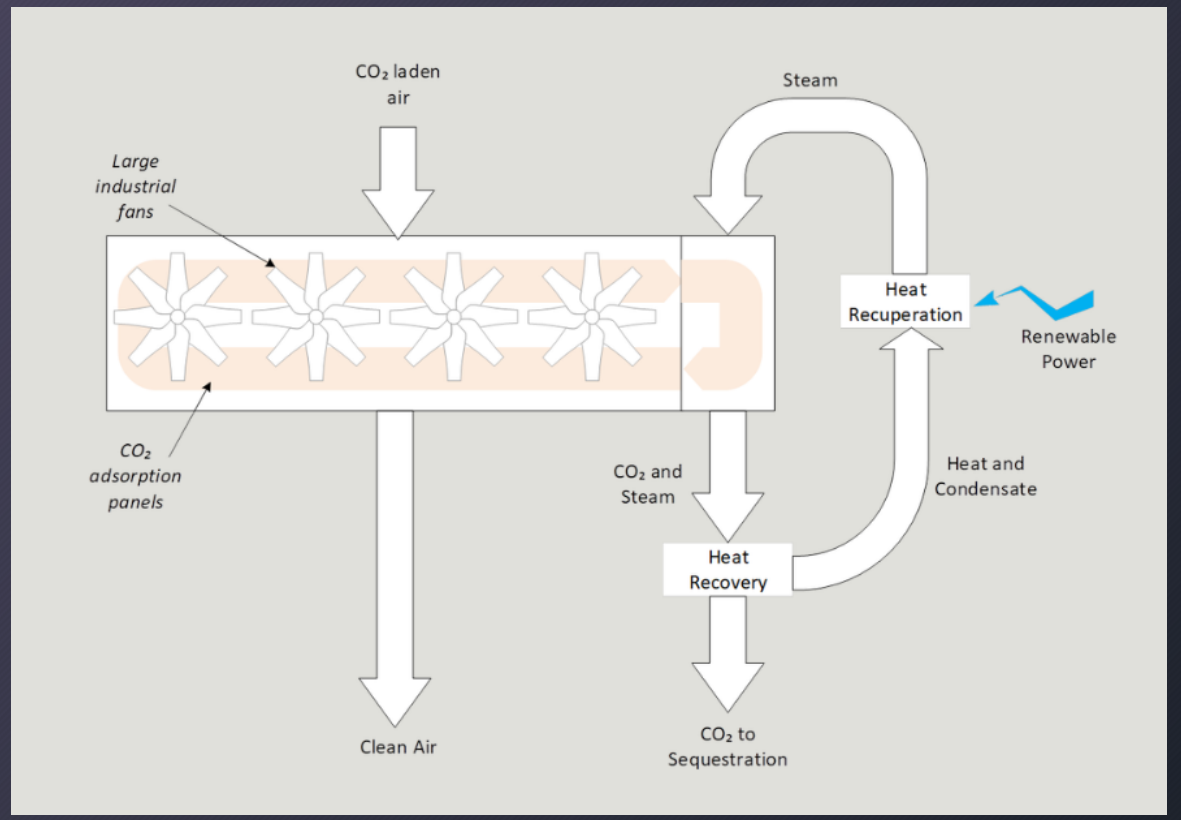
- **Worked for Excelitas in Boulder, CO ~9 months**

- Worked in the EUV Lithography Equipment Development Laser Lab for ASML

- First time encountering information and IP control laws: ITAR (International Traffic in Arms Regulation)

Zero Carbon Systems

- **Started at Zero Carbon Systems in September 2024**
- ZCS is a Direct Air Carbon Capture (DACC) engineering startup located in Brighton, CO
- The lab space was originally part of Global Thermostat, the lab was acquired by Zero Carbon Partners early-mid 2024.
- I was the first lab hire post-acquisition.
- The goal is to create a series of carbon-negative DACC plants.



Zero Carbon Systems Organization

- The company consists of two main parts:
  - On-Site: The on-site team consists of the lab staff and pilot plant scale operators
  - ~20 people

  - Remote Engineers: The Engineers that were part of the acquisition company, Zero Carbon Partners. Scattered across the world, so time zones are problematic
  - ~20 people

What I do in a Day

- **Primary Roles Include:**
  - Analytical Instrument Method Development
  - Data Processing
  - Analytical Tool Development (Python, VBA, and JMP)
  - SOP Development and Writing
  - Instrument Installation, Repairs, and Maintenance
  - QA/QC Company Practices Development
  - Fighting with the CEO/CTO