Thomas Nakamura

Research Physicist

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SUMMARY

Research Physicist with 3 years in industry and a PhD in atomic physics, building compact optical atomic clocks and cold-atom sensors. Works across laser cooling, vacuum systems and control electronics, writes analysis code in Python, and has 6 peer-reviewed papers on precision measurement.

EXPERIENCE

Research Physicist

03/2023 - Present

Front Range Quantum Instruments — Boulder, CO

Research team of 9 developing portable atomic clocks for navigation and telecom timing.

- Design laser cooling and trapping setups for strontium that reach a **2 microkelvin** cloud in 300 milliseconds.
- Reduced the clock vacuum systems from 40 liters to 6 liters while holding pressure below 1e-10 torr.
- Write Python data analysis pipelines that compute clock stability from 30-day runs on 4 prototypes.
- Report results in monthly reviews with engineering and in 2 conference talks a year.

Postdoctoral Research Associate

08/2020 - 02/2023

Mountain States Institute for Precision Measurement — Boulder, CO

Postdoc in an optical frequency metrology group.

- Built a frequency comb link between 2 labs that compared clocks at the 1e-18 level.
- Programmed LabVIEW control for 12 lasers, cutting daily lock-up time from 2 hours to 15 minutes.
- Published 3 papers and secured 1 grant on optical lattice clocks.
- Supervised 4 undergraduate researchers on optics alignment and electronics.

Graduate Research Assistant

08/2015 - 07/2020

University of Colorado Boulder Department of Physics — Boulder, CO

Doctoral research in atomic physics.

- Measured collision shifts in a strontium lattice clock over 500 runs.
- Designed 6 low-noise laser driver circuits used across the lab.
- Authored 3 first-author papers from thesis work.

SKILLS

- **Laser Cooling**
- **Atomic Physics**
- **Optics**
- **Vacuum Systems**
- **Python**
- **LabVIEW**
- **MATLAB**
- **Data Analysis**
- **Electronics**
- **Scientific Writing**

EDUCATION

Doctor of Philosophy

University of Colorado Boulder

Physics

Boulder, CO

07/2020