Chelsea Bartram

Panofsky Fellow, Associate Scientist

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Education

2019 **Ph.D. in Nuclear Physics**, *University of North Carolina*, Chapel Hill
Thesis: A Search for CPT-violation in ortho-Positronium
Advisor: Reyco Henning

2011 **B.A. in Physics, *cum laude***, *Boston University*, Honors
Thesis: Neutrino Oscillation Studies with GLoBES and the T2KK Proposal
Advisor: Ed Kearns

Professional Experience

Oct 2022–Present **Panofsky Fellow**, *SLAC National Accelerator Laboratory*
Principle Investigator of Bartram Lab
- Technical Coordinator for DMRadio-m3
- Lead for DMRadio-50L toroidal magnet acquisition
- Lead for DMRadio-50L data acquisition system
- Analysis Chair for ADMX
- Leading high-frequency R&D ADMX-VERA efforts at SLAC

Mar 2019–2022 **Postdoctoral Researcher**, *University of Washington*
Advisor: Leslie Rosenberg
- Commissioned ADMX detector and led data-taking operations.
- Commissioned Sidecar prototype cavity and led data-taking operations.
- Developed automation scripts for cavity data-taking process.
- Designed RF electronics for resonant feedback injection.
- Created interactive monitoring webpages for data acquisition.
- Demonstrated first implementation of a Josephson Traveling Wave Parametric amplifier in an axion search.

Jan 2014–Feb 2019 **Graduate Student**, *University of North Carolina at Chapel Hill*
Advisor: Reyco Henning
- Developed conceptual design and computed sensitivity of a tabletop search for CP- and CPT-violation in positronium.
- Designed and evaluated experimental source holder configurations to optimize detector performance.
- Designed, optimized and built data acquisition 96-channel (DAQ) system.
- Performed comprehensive detector and DAQ system characterization measurements.
- Conducted ROOT-based data analysis for CPT-violation search.

Awards & Fellowships

2022 Panofsky Fellow

2018 DNP Travel Award

2017 UNC Dissertation Completion Fellowship

2017 3rd Place Poster Prize TAUP

2012 Eugen Merzbacher Fellowship

Selected Invited Talks

2024 Particle Physics Conference, Hyderabad: "Status and Plans of ADMX"

2024 University of Chicago TeVPA: "Low Frequency Dark Matter Waves: a forecast"

2024 UC Santa Cruz: "Ringing in the New Resonators"

2024 Axion Conference at DESY: "Harmonizing the Haloscopes"

2023 LTD Conference in Daejon, Korea: "Search for the QCD Axion with ADMX"

2023 Princeton Wave-Like Dark Matter Workshop: "ADMX"

2022 CMD Manchester: "Exploring the realm of the axion with quantum devices in ADMX"

2022 Yale Wright Lab Seminar: "A Bird's Eye View of Wave-Like Dark Matter"

2022 Recontres de Moriond: "Axion Dark Matter eXperiment"

2022 Joint INPA – RPM Seminar at LBL: "Combing the cosmos: A deep dive into dark matter and fundamental symmetries"

2021 Keynote Address: Australian Research Council Centre of Excellence Workshop: "To see 85% of the world in a grain of sand: search for wave-like dark matter in the ADMX Run 1C dataset"

2021 Rising Stars Symposium: "Winds of change in wave-like dark matter"

2021 Fermilab Users Meeting: "Dark Matter New Horizons"

2021 Cambridge High Energy Workshop: "Venturing a glimpse at the dark matter halo with ADMX"

2021 QSFP UK Workshop: "Axions and Wave-like Dark Matter"

2021 University of Sydney: "Matter matter everywhere but not enough, we think"

2021 Axions Beyond Gen 2 Invited Talk: "Wave-like Dark Matter on the Horizon"

2020 UC Santa Barbara Invited Talk: "Searching for the QCD Axion with the ADMX Receiver"

2020 ICHEP Plenary Talk: "Wave-like dark matter and Axions"

2020 Rice University: "Finding the signal in the noise: an exploration of the Axion Dark Matter eXperiment analysis"

2020 Rutgers University: "Searching for Axion Dark Matter with the ADMX Haloscope"

2020 ICHEP Plenary: "Wave-like dark matter and Axions"

2019 Yale: "The Unexpected World of Discrete Fundamental Symmetries, from Positronium to Axions"

Publications

[1] C Bartram et al. "Dark matter axion search using a Josephson Traveling wave parametric amplifier". In: *Review of Scientific Instruments* 94.4 (2023).

[2] C Bartram et al. "Nonvirialized axion search sensitive to Doppler effects in the Milky Way halo". In: *Physical Review D* 109.8 (2024), p. 083014.

[3] C Bartram et al. "Search for invisible axion dark matter in the 3.3–4.2 μ eV mass range". In: *Physical review letters* 127.26 (2021), p. 261803.

[4] Chelsea Bartram, Reyco Henning, and Daniel Primosch. "Demonstration of o-Ps detection with a cylindrical array of NaI detectors". In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 966 (2020), p. 163856.

[5] Chelsea Bartram et al. "Axion dark matter experiment: Run 1B analysis details". In: *Physical Review D* 103.3 (2021), p. 032002.

[6] C Boutan et al. "Axion Dark Matter eXperiment: Run 1A analysis details". In: *Physical Review D* 109.1 (2024), p. 012009.

[7] S Chakrabarty et al. "Low frequency, 100–600 MHz, searches with axion cavity haloscopes". In: *Physical Review D* 109.4 (2024), p. 042004.

[8] Taj A Dyson et al. "High-volume tunable resonator for axion searches above 7 GHz". In: *Physical Review Applied* 21.4 (2024), p. L041002.

[9] R Khatiwada et al. "Axion dark matter experiment: Detailed design and operations". In: *Review of Scientific Instruments* 92.12 (2021).

[10] Chao-Lin Kuo et al. "Maximizing Quantum Enhancement in Axion Dark Matter Experiments". In: *arXiv preprint arXiv:2411.13776* (2024).

[11] X Li et al. "Compton scattering from He 4 at the TUNL HI γ S facility". In: *Physical Review C* 101.3 (2020), p. 034618.

[12] X Li et al. "Proton Compton scattering from linearly polarized gamma rays". In: *Physical Review Letters* 128.13 (2022), p. 132502.

[13] T Nitta et al. "Search for a dark-matter-induced cosmic axion background with ADMX". In: *Physical Review Letters* 131.10 (2023), p. 101002.

[14] MH Sikora et al. "Compton scattering from He 4 at 61 MeV". In: *Physical Review C* 96.5 (2017), p. 055209.

Computing Skills

Languages	C++, Python, LaTeX, bash	Platforms	Linux, Git, Jupyter
Scientific	ROOT, Geant4	Hardware	Arduino, Raspberry Pi

Supervision

Postdocs
- Andrew Yi (current)

Graduate
- Pam Stark (current, permanent)
- Hope Fu (rotating for one quarter)
- Barkotel Zemenu (rotating for one quarter)

Post-bac
- Jacob Laurel (current)

Undergrad
- Celeste Virador (2024)
- Neel Roy (2024)
- Devansh Dhabhai (2024)
- Shaun Lee (2021)
- Preston Dicks (2020)
- Hima Korandla (2020, now at University of Hawaii)
- Elijah Burns (2020)
- Daniel Primosch (2019-2020, now at UCSB)
- Catriona Thomson (2019)
- Nicole Man (2019, now at PNNL)
- Michaela Guzetti (2019, now at UW)
- Jake Murphy (2016-2018)
- Chiara Salemi (2015-2017, now Berkeley faculty)
- Ryan Petersberg (2015-2016, now at staff at Yale)
- Kadeem Nibbs (2015, now software engineer at Opendoor)
- Baird Howland (2014)

Professional Activities

- KIPAC Post-doctoral fellowship hiring committee (x3)
- KIPAC Post-bac hiring committee (x1)
- Review Panel for DOE HEP Cosmic Frontier (x1)
- Review Panel for DOE HEP R&D (x1)
- Review Panel for NP (x1)
- Review Panel for NSF (x1)
- Co-organizer for the CPAD workshop at SLAC
- Reviewer for Physical Review (x4)
- Hiring committee at CENPA, UW (x2)
- Session Chair for TIPP
- Grant Reviewer for National Science Center of Poland
- Lead Snowmass Community Planning Meeting Session #74
- Coordinated and Wrote 4–10 GHz Axion White Paper for Snowmass

Other

- Conversant in French
- General class license in Amateur Radio, call sign KD8HNZ