Alexandra Behne

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Degrees

Fall 2023–. PhD in physics at the University of Maryland, College Park.

Fall 2019–Spring 2023. Bachelor of science degree in physics with a minor in mathematics with highest honors from Texas A&M University, College Station (TAMU).

Research

Fall 2023–. Graduate student researcher in A. Gorshkov's group (Joint Quantum Institute, Department of Physics, University of Maryland).

Spring 2022–Spring 2023. Model the dynamics of multiqubit systems in cavity quantum electrodynamics in the strong coupling regime with A. Belyanin [TAMU, Dept. of Physics & Astronomy (Dept. of P&A)].

Spring 2022. Work with a scanning tunneling microscope in a low-temperature condensed matter lab with one other undergraduate student and G. Agnolet (TAMU, Dept. of P&A).

Summer 2020. Represent or prove impossibility of representation of 5-or-less element convex geometries with circles on the plane as a part of K. Adaricheva's (Hofstra University, Dept. of Mathematics) group of undergraduate students for Polymath REU.

Spring 2020–Summer 2020. Numerically model abundance of dark matter candidates using adaptive step-size methods in R. E. Allen's (TAMU, Dept. of P&A) undergraduate group.

Awards

Graduate student fellowship from the Joint Quantum Institute.

Undergraduate research scholarship from TAMU Dept. of P&A faculty member.

Honors scholarship from TAMU Dept. of P&A.

TAMU College of Science Dean's Honor Roll.

Research papers

M. Tokman, **A. Behne**, B. Torres, M. Erukhimova, Y. Wang, A. Belyanin, *Dissipation-driven formation of entangled dark states in strongly-coupled inhomogeneous many-qubit systems in solid-state nanocavities*, Accepted by Phys. Rev. A (2023), `arxiv.org/abs/2207.09523`.

R. Thornberry, G. Frohaug, C. LaFontaine, B. Tallman, **A. Behne**, S. Sellers, M. Sadler, R. E. Allen, *Present and potential future experimental evidence supporting a multicomponent dark matter scenario*, Eur. Phys. J. Spec. Top. **230**, 1121–1130 (2021), `doi.org/10.1140/epjs/s11734-021-00093-1`.

Polymath REU Convex Geometries Collaboration, *Convex geometries representable by at most 5 circles on the plane*, (2020), `arxiv.org/abs/2008.13077`.

Other papers

A. Behne, *Projection and rotation operations on Cartesian vectors*, Lecture notes for PHYS 101 Undergraduate Teaching Fellowship (2022).

A. Behne, *Validity of triangle congruence criteria under the taxicab norm*, Term paper for a math course on Euclidean and hyperbolic non-Euclidean geometry (2022).

A. Behne, *Equinumerosity of line sets in projective and affine geometries via perspectivity*, Term paper for a math course on Euclidean and hyperbolic non-Euclidean geometry (2022).

Y. F. Alam, **A. Behne**, *Review of Born–Infeld electrodynamics*, `arxiv.org/abs/2111.08657`, Term paper for electricity and magnetism course (2021).

Y. F. Alam, **A. Behne**, R. Chisholm, J. Compton, *Green functions in electrostatics*, Term paper for electricity and magnetism course (2020).

A. Behne, *Equation of state for classical, Fermi, Bose and van der Waals gasses*, Term paper for optics and thermodynamics course (2019).

Talks and presentations

A. Behne, A. Belyanin, *Field geometry in tip-induced plasmonic nanocavities for strongly-coupled inhomogeneous many-qubit systems via the method of images*, Fall Meeting of the Texas Section of the APS (2022).

Homework-problem group presentations for a math course on Euclidean and hyperbolic non-Euclidean geometry (2022).

Homework-problem presentations for statistical mechanics course (2021)

Measuring the speed of light with a tabletop setup, Talk for third-year physics laboratory course (2021).

Boltzmann constant via Johnson noise, Poster presentation for third-year physics laboratory course (2021).

Polymath REU Convex Geometries Collaboration, *Convex geometries representable by at most 5 circles on the plane*, Presentation of collaboration results to 2020 Polymath REU group.

Spring 2020–Summer 2020. Weekly status reports to research group at group meetings.

Teaching and teaching-related positions

Spring 2023. Teaching assistant for TAMU PHYS 221 (Optics and Thermal Physics), a physics course for second-year physics undergraduates. Grade homework assignments.

Spring 2023. Teaching assistant for TAMU PHYS 222 (Modern Physics for Engineers), a physics course for engineering undergraduates. Grade exams and hold office hours.

Spring 2023. Teaching assistant for TAMU PHYS 309 (Modern Physics), a physics course for second-year physics undergraduates. Grade homework assignments.

Fall 2022. Teaching assistant for TAMU PHYS 101. Deliver and create homework assignments for lectures on a topic in mathematics applied to physics; mentor first-year physics students.

Summer 2022–Fall 2022. Lab manager and outreach assistant for TAMU Dept. of P&A. Build, manage, and maintain lab equipment and physics demonstrations; organize TAMU Dept. of P&A outreach events for the general public, e.g.,

- TAMU Physics Show,
- Game Day Physics,
- Physics Demonstrations at First Friday,
- TAMU Physics and Engineering Festival;

develop resources for physics educators including the Mitchell Institute Physics Enhancement Program, a free professional development program for secondary-school physics teachers with little to no physics background, and the Texas Higher Education Coordinating Board's Digital Design for Student Success Project.

Fall 2020–Fall 2022. Tutor for TAMU Academic Success Center. Tutor students in physics and math courses (e.g., algebra- and calculus-based physics, introductory Python course); assist students both one-on-one and in small groups; lead professional development seminars for other tutors.

Fall 2020. Teaching assistant for TAMU's first-year experience course. Lead group discussions with students during weekly one-hour lecture; meet with students one-on-one throughout the semester to discuss academic standing.

Participation in TAMU student organizations

Society of Physics Students (SPS).

Society for the Underrepresented in Physics and Astronomy (SUPA).

Art Etcetera (an art club).