Huan Q. Bui

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Education

PhD in Experimental Atomic, Molecular, and Optical Physics
Massachusetts Institute of Technology, GPA: 4.9/5.0 2021–

B.A., Summa Cum Laude, Honors in Physics, Honors in Mathematics, minor in Statistics
Colby College, Class Marshal 2017–2021

Honors Thesis in Physics (with Prof. Charles Conover)
Honors Thesis in Mathematics (with Prof. Evan Randles)

Research Experience

PhD Candidate, Ultracold Quantum Gases Group, Massachusetts Institute of Technology 2021–
Advisor: Martin Zwierlein

- Ultracold Bose-Fermi mixtures, weakly-bound and ground-state molecules of ^{23}Na and ^{40}K
- Sound in a spin-imbalanced, strongly interacting, homogeneous Fermi gas of ^{6}Li

Undergraduate Researcher, Perimeter Institute for Theoretical Physics Summer 2020
Advisor: Timothy Hsieh

- Variational simulation of non-trivial quantum states

Research Assistant, Colby College Dept. of Mathematics & Statistics 2019–2021
Advisor: Evan Randles

- Generalized polar-coordinate integration formula with applications to convolution powers of complex functions on $\mathbb{Z}^d$

Research Assistant, Joint Quantum Institute, College Park Summer 2019
Advisor: Steven Rolston

- Python-based hardware-software interface for experimental control
- Vacuum-induced collective quantum beats of Rb atoms trapped around an optical nanofiber (paper)

Research Assistant, Colby College Dept. of Physics & Astronomy 2017–2021
Advisor: Charles Conover

- Lifetime measurement of $5P_{1/2}$ and $5P_{3/2}$ in ^{39}K 2019–2021
- Precision measurements on ^{39}K in Rydberg states 2017–2019

Teaching Experience

Teaching Assistant, Colby College Dept. of Physics & Astronomy 2017–2021
Teaching Assistant, Colby College Dept. of Mathematics & Statistics 2018–2021
Mathematics & Physics Tutor, Colby College Deans of Studies 2018–2020

Publications/Preprint

1. **Bui, H.Q.**, Randles, E. A Generalized Polar-Coordinate Integration Formula with Applications to the Study of Convolution Powers of Complex-Valued Functions on $\mathbb{Z}^d$. Journal of Fourier Analysis and Applications **28**, 19 (2022). arXiv:2103.04161, SpringerLink

Presentations

1. E. Wolf, **H. Bui**, P. Patel, Z. Yan, C Robens, R. Fletcher, M. Zwierlein (2022), *Hydrodynamic Properties of the Unitary Fermi Gas* (abstract), DAMOP 22
2. **Huan Q. Bui**, Evan Randles (2021), *A generalized polar-coordinate integration formula with applications to convolution powers and local (central) limit theorems* (pdf), Joint Mathematics Meetings 2021
3. **Huan Q. Bui** (Jun 2020), *Measurement-assisted variational simulation of non-trivial quantum states*, Perimeter Institute Undergrad Intern Symposium 2020
4. C. Conover, A. Hill, **HQ Bui** (May 2020), *Measurements of f-, g-, and h-state quantum defects in Rydberg states of potassium* (abstract), DAMOP 20
5. C. Conover, **HQ Bui** (May 2019), *Measurements of p-state fine structure and quantum defects for Rydberg states of potassium* (abstract), DAMOP 19
6. C. Conover, **HQ Bui** (May 2019), *Millimeter-wave precision spectroscopy of d-d transitions in ^{39}K Rydberg states*, DAMOP 19
7. **Huan Q. Bui**, *Matrices in Quantum Computing: A 2-qubit entanglement circuit*, CLAS 2019
8. **Huan Q. Bui**, *Precision measurement of potassium energy levels at highly excited states* CUSRR 2018

Awards & Honors

1. Class Marshal (graduated with the highest GPA), Colby College, 2021
2. Senior Prize in Physics and Astronomy, Colby College, 2021
3. Marston Morse Prize in Mathematics, Colby College, 2021
4. Sigma Pi Sigma NHS, 2021
5. Williams A. Rogers Prize in Physics and Astronomy, Colby College, 2020
6. Phi Beta Kappa, 2020
7. Mu Sigma Rho, 2020
8. Honorable Mention, COMAP Mathematical Contest in Modeling, 2020
9. Linda K. Cotter Internship Fund, 2020
10. Phi Beta Kappa Scholastic Achievement Award, 2019
11. Julius Seelye Bixler Scholar, 2018, 2019, 2020
12. Meritorious Winner (top 8% of 10,000 teams), COMAP Mathematical Contest in Modeling, 2019
13. Dean's List, F'17, S'18, F'18, S'19, F'19, (S'20, F'20 – canceled due to COVID-19), S'21

Skills

- Experimental atomic, molecular, and optical physics
- Programming/Scripting Languages: Python (numpy, scipy, pandas), MATLAB, Mathematica, HTML & CSS, LaTeX, R
- Softwares: Ansys HFSS, MATLAB, SolidWorks, IGOR Pro, NI-MAX, PicoHarp & TimeHarp, MS Office, Adobe Illustrator, Adobe Lightroom