

Fangzhao Alex An

Physics Ph.D. Student

University of Illinois at Urbana-Champaign

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Education

Ph.D. Physics – 2020 (*expected*)

University of Illinois at Urbana-Champaign

B.S. Physics – 2014

Harvey Mudd College

High Distinction and Department Honors – 3.91 GPA

Research Experience

Bryce Gadway Lab – University of Illinois at Urbana-Champaign

2014 – ∞

- ▷ Quantum simulation of tight-binding models with cold atoms in momentum-space optical lattices.
- ▷ Built BEC/optical lattice apparatus from the ground up.

Theresa Lynn Lab – Harvey Mudd College

2011 – 2014

- ▷ Undergraduate thesis: Simulated and experimentally probed slowly rotating modes of light.
- ▷ Earlier work: Improved entanglement of photon orbital angular momentum for quantum cryptography.

Vanessa Sih Lab – University of Michigan

2013

- ▷ Constructed imaging setup to observe new generation of GaAs/InGaAs samples.
- ▷ Helped fabricate semiconductor samples for use in spintronics research.

Richard Haskell Lab – Harvey Mudd College

2012 – 2013

- ▷ Improved and implemented ISAM algorithm on GPUs to speed up frequency-domain optical coherence microscopy.

Teaching Experience

Physics Tutor – University of Illinois at Urbana-Champaign

2015 – 2016

- ▷ Conducted one-on-one tutoring with students taking calculus-based and non-calculus Mechanics and Electromagnetism.

E&M Lab TA – University of Illinois at Urbana-Champaign

2014

- ▷ Guided students of calculus-based E&M (Physics 212) through experiments.
- ▷ Taught three sections, held office hours, and graded assignments.

Academic Excellence Facilitator – Harvey Mudd College

2012 – 2014

- ▷ Tutored groups of students in core physics courses: Special Relativity, Classical Mechanics, and Electromagnetic Theory & Optics.

Physics Tutor – Harvey Mudd College 2013

- ▷ Conducted one-on-one tutoring with students taking introductory and advanced physics courses.

Lab Assistant – Harvey Mudd College 2012 – 2013

- ▷ Set up, tested, and maintained experiments for introductory physics lab, sophomore physics choice lab, and modern lab.

Physics Grader – Harvey Mudd College 2011 – 2012

- ▷ Graded Special Relativity and Classical Mechanics.

Awards and Honors

Lindau Nobel Laureate Meeting	2019
UIUC University Fellowship	2016
HMC Dean's List	2011-2014
Rojansky Writing Award for Quantum Physics	2012
CRC Press Chemistry Achievement Award	2011
National Merit Scholarship	2010
Arcadia High School Salutatorian	2010

Publications

11. *Observation of the topological Anderson insulator in disordered atomic wires*
Eric J. Meier, **Fangzhao Alex An**, Alexandre Dauphin, Maria Maffei, Pietro Massignan, Taylor L. Hughes, and Bryce Gadway
Science **362**, 929 (2018).
10. *Engineering tunable local loss in a synthetic lattice of momentum states*
Samantha Lapp, Jackson Ang'ong'a, **Fangzhao Alex An**, and Bryce Gadway
Preprint: arXiv:1811.06046, accepted to *New J. Phys.*
9. *Engineering a flux-dependent mobility edge in disordered zigzag chains*
Fangzhao Alex An, Eric J. Meier, and Bryce Gadway
Phys. Rev. X **8**, 031045 (2018).
8. *Correlated dynamics in a synthetic lattice of momentum states*
Fangzhao Alex An, Eric J. Meier, Jackson Ang'ong'a, and Bryce Gadway
Phys. Rev. Lett. **120**, 040407 (2018).
7. *Diffusive and arrested transport of atoms under tailored disorder*
Fangzhao Alex An, Eric J. Meier, and Bryce Gadway
Nat. Commun. **8**, 325 (2017).
6. *Exploring quantum signatures of chaos on a Floquet synthetic lattice*
Eric J. Meier, Jackson Ang'ong'a, **Fangzhao Alex An**, and Bryce Gadway
Preprint: arXiv:1705.06714, in publication limbo
5. *Direct observation of chiral currents and magnetic reflection in atomic flux lattices*
Fangzhao Alex An, Eric J. Meier, and Bryce Gadway
Sci. Adv. **3**, e1602685 (2017).

4. *Observation of the topological soliton state in the Su-Schrieffer-Heeger model*
Eric J. Meier, **Fangzhao Alex An**, and Bryce Gadway
Nat. Commun. **7**, 13986 (2016).
3. *Atom optics simulator of lattice transport phenomena*
Eric J. Meier, **Fangzhao Alex An**, and Bryce Gadway
Phys. Rev. A **93**, 051602(R) (2016).
2. *Experimental Realization of Slowly Rotating Modes of Light*
Fangzhao A. An
HMC Senior Theses, Paper 53 (2014).
1. *Robust, real-time, digital focusing for FD-OCM using ISAM on a GPU*
Luke R. St. Marie, **Fangzhao A. An**, Anthony L. Corso, John T. Grasel, and Richard C. Haskell
Proc. SPIE **8934**, 89342W (2014).

Presentations

Talks

4. DAMOP 2019
Many-body effects in momentum-space lattices
Milwaukee, WI, May 2019
3. DAMOP 2017
Engineering arbitrary synthetic gauge fields in multiple geometries
Sacramento, CA, Jun 2017
2. Midwest Cold Atom Workshop 2016 (invited)
Studying disorder and topology using atomic momentum states
University of Chicago, Oct 2016
1. DAMOP 2016
Disordered quantum walks in a momentum-space lattice
Providence, RI, May 2016

Posters

8. Midwest Cold Atom Workshop 2018
Many-body effects in synthetic lattices
University of Illinois at Urbana-Champaign, Oct 2018
7. International Conference on Atomic Physics (ICAP) 2018
Many-body effects in synthetic lattices
Barcelona, Spain, July 2018
6. Midwest Cold Atom Workshop 2017
Ultracold atom dynamics in tailored disorder and synthetic gauge fields
University of Michigan, Oct 2017
5. DAMOP 2017
Ultracold atom dynamics in tailored disorder and synthetic gauge fields
Sacramento, CA, Jun 2017

4. Midwest Cold Atom Workshop 2016
Engineering synthetic gauge fields with arbitrary flux patterns
University of Chicago, Oct 2016
3. DAMOP 2016
Atom optics simulator of lattice transport phenomena
Providence, RI, May 2016
2. Midwest Cold Atom Workshop 2015
Towards studying topological matter with cold atoms in optical lattices
University of Wisconsin-Madison, Nov 2015
1. Southwest Quantum Information and Technology Workshop 2014
Toward quantum communication with qudits: measuring orbital angular momentum entangled photon pairs from SPDC
Santa Fe, NM, Feb 2014