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

Drickamer Research Fellowship *2019*
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. *Engineering tunable local loss in a synthetic lattice of momentum states*
Samantha Lapp, Jackson Ang'ong'a, **Fangzhao Alex An**, and Bryce Gadway
New J. Phys. **21**, 045006 (2019).

10. *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). [arXiv]

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). [arXiv]

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, accepted to *Phys. Rev. A* [arXiv]

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). [arXiv]
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