



DAVID D. DAI

dddai@mit.edu

SUMMARY

Passionate about combining theory and computation to solve the universe's most difficult problems and develop impactful applications. Interested in condensed matter theory and quantum information science.

EDUCATION

MIT Class of 2025

Massachusetts Institute of Technology

- BS in Physics, accepted to MIT as a high-school junior, GPA: 5.0/5.0

Aug. 2021 – May 2025

Cambridge, MA

EXPERIENCE

Condensed Matter Theory Research

[Liang Fu Group](#), Massachusetts Institute of Technology

- Studying strongly correlated two-dimensional phases of matter in TMD heterostructures such as exciton superfluids and composite Wigner crystals using theoretical and computational methods
- Collaborated with [Feng Wang group](#) (UC Berkeley) and [Kin Fai Mak and Jie Shan group](#) (Cornell) to guide and interpret experiments, including confirmation of our theoretical predictions

Jan. 2023 - present

Cambridge, MA

Condensed Matter Theory Research

[Marin Soljagic Group](#), Massachusetts Institute of Technology

- Developed DFT techniques to model the dynamics of hole polaron formation in silica

Feb. 2022 - Mar. 2023

Cambridge, MA

Quantum Computing Research

Harvard John A. Paulson School of Engineering and Applied Sciences

- Designed a passive and tunable controlled-phase gate on photonic qubits

May 2020 - Aug. 2021

Cambridge, MA

PUBLICATIONS

1. [David D. Dai](#) and [Liang Fu](#) (2023). [Strong-coupling phases of trions and excitons in electron-hole bilayers at commensurate densities](#). arXiv:2308.00825.
2. [Di Luo](#), [David D. Dai](#), and [Liang Fu](#) (2023). [Pairing-based graph neural network for simulating quantum materials](#). arXiv:2311.02143.
3. [Ruishi Qi](#), [Qize Li](#), [Zuocheng Zhang](#), [Sudi Chen](#), [Jingxu Xie](#), [Zhiyuan Cui](#), [David D. Dai](#), [Andrew Y. Joe](#), [Takashi Taniguchi](#), [Kenji Watanabe](#), [Sefaattin Tongay](#), [Alex Zettl](#), [Liang Fu](#), and [Feng Wang](#) (2023). [Electrically controlled interlayer trion fluid in electron-hole bilayers](#). arXiv:2312.03251.
4. [David D. Dai](#), [Ali Ghorashi](#), and [Marin Soljagic](#) (2023). [Formation of Self-Trapped Holes in Silica From Density Functional Theory](#). APS March Meeting Poster.
5. [Derek S. Wang](#)[†], [David D. Dai](#)[†], and [Prineha Narang](#) (2022). [Tunable quantum logic gate on photonic qubits with a ladder emitter](#). Applied Physics Letters.

([†] = equal contribution)

ACHIEVEMENTS

US Physics Team

American Association of Physics Teachers, American Institute of Physics

- Top 20 students nationwide in the 2019 US Physics Olympiad as a high school freshman, [see biography](#)

May 2019 - Jun. 2019

College Park, MD

OUTREACH

International Physics Olympiad (IPhO) Grader & Moderator

International Physics Olympiad

- Graded theory problems for 9 countries and led scoring negotiations with country leaders

July 2022

Zürich, Switzerland