Jacob H. Nie

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Personal Information

Personal email: jacobnie2008@gmail.com (preferred)
School email: jacobhnie@ucsb.edu
Current residence: Santa Barbara, CA
Age: 20

Education

University of California, Santa Barbara

B. S., Physics, 2020–2023

GPA: 3.97/4.00

Experience

Undergraduate researcher, UC Santa Barbara (April 2021–Present)

PI: *Prof. Chenhao Jin*

Research focus: Optical spectroscopy of quantum phases of strongly correlated excitons in WSe2/WS2 heterostructures; transport and optical characterization of electronic order in semiconductor moire superlattices

Visiting student, UC Berkeley (June 2021–September 2021)

PI: *Prof. Feng Wang*

Research focus: Fabricating 2D van der Waals heterostructures, and optical spectroscopy of twisted TMD heterostructures.

Selected Honors

Frances Colville & Terry Dearborn Memorial Award (UCSB College of L&S) (2023)

Worster Summer Research Fellowship (UCSB Department of Physics) (2022)

Barry Goldwater Scholarship: nominee (2022)

USA Physics Olympiad National Team Training Camp Attendee (2019)

USA Physics Olympiad: Gold Medalist (2019)

PUBLICATIONS

E. C. Regan, Z. Lu, D. Wang, Y. Zhang, T. Devakul, **J. H. Nie**, Z. Zhang, W. Zhao, K. Watanabe, T. Taniguchi, S. Tongay, A. Zettl, L. Fu, F. Wang. Spin transport of a doped Mott insulator in moiré heterostructures. (Submitted)

R. Xiong, S. B. Brantly, K. Su, **J. H. Nie**, R. Banarjee, H. Ruddick, Z. Zhang, K. Watanabe, T. Taniguchi, S. Tongay, C. Xu, C. Jin. Tunable transient valley-pseudospin orders in a moiré Bose-Hubbard model. (Submitted)

A. Rossi, J. Zipfel, I. Maity, M. Lorenzon, L. Francaviglia, E. C. Regan, Z. Zhang, **J. H. Nie**, E. Barnard, K. Watanabe, T. Taniguchi, E. Rotenberg, F. Wang, J. Lischner, A. Raja, A. Weber-Bargioni. Anomalous interlayer exciton diffusion in WS2/WSe2 moiré heterostructure. (Submitted)

R. Xiong, **J. H. Nie**, S. B. Brantly, P. Hays, R. Sailus, K. Watanabe, T. Taniguchi, S. Tongay, C. Jin. Bosonic Mott insulator in WSe2/WS2 moiré superlattice. *Science* **380**, 860-864 (2023).

PRESENTATIONS

Many body physics in semiconductor moiré heterostructures. Honors Thesis Seminar. (May 2023)

Simulating the Bose-Hubbard model in semiconductor moiré superlattices. Worster Fellowship Symposium. (Oct. 2022)

SELECTED COURSEWORK

PHYS 13A,B,C - Honors Experimental Physics (A, A, A-)

PHYS 101 - Complex Variables (A+)

PHYS 104 - Advanced Mechanics (A+)

PHYS 110A,B - Electromagnetism (A+, A+)

PHYS 123B - Topics in Condensed Matter Physics (A+)

PHYS 215A,B,C - Quantum Mechanics* (A+, A+, A+)

PHYS 223A - Condensed Matter Physics* (A+)

ECE 162C - Optoelectronic Materials and Devices (A+)

* *Graduate course*