# Shuyang Cao | Résumé

⊠ shuyang.cao@pitt.edu (D) 0000-0001-6411-454X

• ttps://caosy.github.io **8** PTBaMFAAAAAJ •

CaoSY • S.Cao.28

#### **Research Interest**

Nonequilibrium Dynamics, Dark Matter, Gravitational Wave, Quantum Information

•

#### Education

<b>University of Pittsburgh</b> Ph.D. in <i>Physics</i> GPA 3.983/4 Advisor: Prof. Adam K Leibovich, Prof. Daniel Boyanovsky	<b>Pittsburgh</b> Aug. 2019 – present
<b>University of Pittsburgh</b> M.S. in <i>Physics</i>	<b>Pittsburgh</b> Aug. 2019 – May. 2020
<b>Peking University</b> B.S. in <i>Electronic and Information Science and Technology</i> Advisor: Prof. Xiaoji Zhou	<b>Beijing</b> Sep. 2014 – Jul. 2018
Hong Kong University of Science and Technology Non-degree Undergraduate Exchange Program TGA: 4.060/4.3	Hong Kong Sep. 2016 – Dec. 2016
Summer Schools	
<b>51st SLAC Summer Institute (SSI 2023)</b> <i>Program topic</i> : <i>Maching learning across the frontiers</i> <i>Poster presentation</i> : <i>Dynamics of Neutral (pseudo-)scalar Field Mixing</i>	<b>SLAC</b> Aug. 718, 2023
<b>Qiskit Global Summer School 2023</b> Program topic : Theory To Implementation Certification : Qiskit Global Summer School 2023 - Quantum Excellence §	<b>IBM</b> Jul. 17-28, 2023
<b>The 3rd Condensed Matter Summer School</b> <i>Program topic</i> : Dynamics and Quantum Information in Many-body System <i>Poster presentation</i> : Axionic Responses in Materials Meet Cosmic Axions	University of Minnesota s Jun. 12-21, 2023
Michigan Cosmology Summer School 2023	Univeresity of Michigan Jun. 5-9, 2023

## **Selected Honors and Awards**

Andrew W. Mellon Predoctoral Fellow Academic year 2023-2024 University-wide fellowship awarded to doctoral students of exceptional promise and ability across the disciplines.

**Dietrich School of Arts and Sciences Summer Fellowship** awarded to top first-year graduate students in good academic standing Summer. 2020

## **Talks and Presentations**

<b>The 6th Neighborhood Workshop at Penn State University</b>	<b>State College, U.S.</b>
<i>Title : Is the effective potential, effective for dynamics?</i>	<i>Apr. 25, 2023</i>
<b>APS April Meeting 2024</b>	Sacramento, US
<i>Title</i> : <i>Scalar field mixing induced by common intermediate states</i>	Apr. 3, 2024
<b>APS March Meeting 2024</b>	Minneapolis, US
<i>Title</i> : <i>Harnessing synthetic axions to probe a cosmological axion</i>	Mar. 6, 2024
<b>2023 Annual Meeting of the APS Mid-Atlantic Section</b>	<b>Newark, US</b>
<i>Title : Field Mixing of Axions in Early Universe and in Condensed Matter</i>	<i>Nov.</i> 4, 2023
<b>Phenomenology 2023 Symposium</b>	<b>Pittsburgh, U.S.</b>
<i>Title</i> : Imprints of Axion's Evolution in CMB	<i>May 9, 2023</i>
<b>APS April Meeting 2023</b>	<b>Online</b>
<i>Title</i> : <i>Brownian Axion-like Particles in Cosmic Microwave Background</i>	<i>Apr. 25, 2023</i>
<b>The 5th Neighborhood Workshop at Penn State University</b>	<b>State College, U.S.</b>
<i>Title</i> : <i>Chern-Simons Condensate from Misaligned Axions</i>	<i>Apr. 6, 2023</i>
2022 Annual Meeting of the APS Mid-Atlantic Section	State College, U.S.
Title : Drownian Axion-like Farticles	Dec. 3, 2022

## Publications

- [1] Shuyang <u>Cao</u>. "Oscillations of density and coherence in field mixing". In: (to be submitted).
- [2] **Shuyang** <u>Cao</u>, Mehbub Khan, Arnab Dasgupta, Zixin Yang, and Adam K Leibovich. "The Memory Term from Effective Field Theory". In: (in progress).
- [3] Nathan Herring, <u>Shuyang Cao</u>, and Daniel Boyanovsky. "Is the effective potential effective for dynamics?" In: *Phys. Rev. D* 109 (10 May 2024), p. 105021. DOI: 10.1103/PhysRevD.109.105021. arXiv: 2403.07084 [hep-ph].
- [4] Shuyang <u>Cao</u> and Daniel Boyanovsky. "Effective field theory of particle mixing". In: Phys. Rev. D 109 (3 Feb. 2024), p. 036038. DOI: 10.1103/PhysRevD.109.036038.
- [5] Shuyang Cao, Wenjie Huang, and Daniel Boyanovsky. "Dynamics of axion-neutral pseudoscalar mixing". In: Phys. Rev. D 108 (2 July 2023), p. 025012. DOI: 10.1103/PhysRevD.108.025012.
- [6] Shuyang <u>Cao</u> and Daniel Boyanovsky. "Chern Simons condensate from misaligned axions". In: <u>Phys. Rev. D</u> 107 (8 Apr. 2023), p. 083531. DOI: 10.1103/PhysRevD.107.083531.
- [7] <u>Shuyang Cao</u> and Daniel Boyanovsky. "Nonequilibrium dynamics of axionlike particles: The quantum master equation". In: *Phys. Rev. D* 107 (6 Mar. 2023), p. 063518. DOI: 10.1103/ PhysRevD.107.063518.
- [8] Shuyang <u>Cao</u> and Daniel Boyanovsky. "Brownian axionlike particles". In: Phys. Rev. D 106 (12 Dec. 2022), p. 123503. DOI: 10.1103/PhysRevD.106.123503.
- [9] <u>Shuyang Cao</u>, Pengju Tang, Xinxin Guo, Xuzong Chen, Wei Zhang, and Xiaoji Zhou. "Extraction and identification of noise patterns for ultracold atoms in an optical lattice". In: *Opt. Express* 27.9 (Apr. 2019), pp. 12710–12722. DOI: 10.1364/0E.27.012710.
- [10] Dong Hu, Lin-Xiao Niu, Jia-Hua Zhang, Xin-Hao Zou, <u>Shu-Yang Cao</u>, and Xiao-Ji Zhou. "Coupled Two-Dimensional Atomic Oscillation in an Anharmonic Trap". In: *Chinese Physics Letters* 34.7 (July 2017), p. 076701. DOI: 10.1088/0256-307x/34/7/076701.