# Jinzheng Li

Ph.D. Candidate in Physics, Northeastern University

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# Research Interests

Early-universe cosmology; first-order phase transitions; stochastic gravitational waves; dark sectors; thermal history of the universe.

#### Education

Northeastern University, Boston, MA — Ph.D. in Physics

Sept 2020 - Present

Advisor: Prof. Pran Nath

Stony Brook University, Stony Brook, NY — B.S. in Physics & Mathematics

Aug 2016 - Dec 2019

GPA: Overall 3.72/4.00; Physics 3.82/4.00; Mathematics 3.72/4.00

## **Publications**

- 1. W.-Z. Feng, **J. Li**, P. Nath and Z.-H. Ye, "Gauge-Invariant Gravitational Waves from Cogenesis in a B-L Conserving Universe," arXiv:2510.13770.
- 2. **J. Li** and P. Nath, "Supercooled Phase Transitions: Why Thermal History of Hidden Sector Matters in Analysis of Pulsar Timing Array Signals," arXiv:2501.14986.
- 3. W.-Z. Feng, J. Li, and P. Nath, "Cosmologically Consistent Analysis of Gravitational Waves from Hidden Sectors," arXiv:2403.09558.
- 4. **J. Li**, P. Nath and Raza M. Syed, "A natural MSSM from a novel SO(10), Yukawa unification, light sparticles, and SUSY implications at LHC" arXiv:2503.19871.
- 5. J. Li and P. Nath, "Big Bang Initial Conditions and Self-Interacting Hidden Dark Matter," arXiv:2304.08454.

# Research & Professional Experience

# High Energy Theory Group, Northeastern University

Jan 2022 - Present

Advisor: Prof. Pran Nath

- Research on dark sectors, early-universe evolution, and gravitational-wave signatures from first-order phase transitions.
- Develop and validate numerical pipelines for effective potentials, tunneling/bounce actions, and GW spectra.

#### Teaching Assistant, Northeastern University

Sept 2020 - Present

• Teaching assistant for Quantum Mechanics, Quantum Field Theory, Particle Physics, Cosmology, Electronics laboratories, and Undergraduate Physics Laboratories

## PiTP Summer School, IAS

July 2025

• Topic: Gravitational Waves from Theory to Observation

#### Physics Tutorial in Advanced Topics, Stony Brook University

Aug 2019 - Dec 2019

Advisor: Prof. Martin Roček

• Independent study: Lie Groups in Particle Physics.

#### ATLAS Research Group, Stony Brook University

May 2018 - May 2019

Advisor: Prof. Giacinto Piaquadio

- Multivariate analysis of  $H \to b\bar{b}$  decay
- Implemented deep learning and boosted decision trees for signal discrimination.

### Mathematics Honors Thesis, Stony Brook University

Sept 2018 - Dec 2018

Advisor: Prof. Marcus Khuri

• Thesis: Introduction to Characteristic Classes; covered vector bundles, cohomology, Stiefel-Whitney classes, and applications.

## Awards & Honors

Undergraduate Dean's List (5 semesters)

Undergraduate Honors Program in Mathematics and Physics

Sigma Pi Sigma, National Physics Honor Society

## Technical Skills

Coding Python, CPP, C#, Fortran, Visual Basic, LATEX

Scientific ROOT, Mathematica, Keras, PyTorch

# Other Interests

Indie game developer, Bassist in a band, LLM related. See more on my personal website https://jinzheng.li.