

# Himanish Ganjoo

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## CONTACT INFORMATION

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[himanishganjoo.com](http://himanishganjoo.com)

## EDUCATION

**Department of Physics, North Carolina State University**  
Ph.D., Physics, 2018 - current  
**Visiting Graduate Student, Perimeter Institute for Theoretical Physics**

**School of Physical Sciences, Jawaharlal Nehru University**  
M.Sc. Physics — 2016 - 2018

**Birla Institute of Technology and Science, Pilani, India**  
B.E. (Honors), Electrical and Electronics Engineering, 2011-2015

## GRADUATE RESEARCH PROJECTS

**Constraining Early Matter Domination with the Isotropic Gamma Ray Background Signal**  
June 2023 - current  
with Dr. Sten Delos (MPA-Garching / Carnegie Observatories)

**Simulations of Gravitational Heating**  
June 2022 - June 2023  
with Dr. Sten Delos (MPA-Garching / Carnegie Observatories)

**The Impact of Hidden Sector Particles on the Matter Power Spectrum**  
June 2019 - September 2022  
with Dr. Katherine Mack (NCSU) and Dr. Adrienne Erickcek (UNC, Chapel Hill)

**Painting Halos on to Galaxies with Machine Learning**  
February 2023 - current  
with Jordan Krywonos and Dr. Matthew Johnson (Perimeter Institute)

## PUBLICATIONS

**H. Ganjoo**, M.S. Delos.; *Simulations of Gravitational Heating Due to Early Matter Domination*. arXiv: [2306.14961](https://arxiv.org/abs/2306.14961). Submitted to *JCAP*.

**H. Ganjoo**, A.E. Erickcek, W. Lin, K.J. Mack.; *The effects of relativistic hidden sector particles on the matter power spectrum*. arXiv: [2209.02735](https://arxiv.org/abs/2209.02735). Published in *JCAP* 01 (2023) 004.

W. Lin, X. Chen, **H. Ganjoo**, L. Hou, K.J. Mack.; *Cosmology of Single Species Hidden Dark Matter*. arXiv: [2305.08943](https://arxiv.org/abs/2305.08943). Submitted to *JCAP*.

## OTHER RESEARCH

**Effective Field Theory of Large-Scale Structure**  
January 2018 - May 2018

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*Advisor: Dr. Debashis Ghoshal*

Studying the formulation of an effective field theory of large-scale structure, by understanding and numerically solving the matter perturbation equations with effective source terms arising from second order perturbations. Report [here](#).

## Non-Universality of the Halo Mass Function

May 2017 - August 2017

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*Advisor: Dr. Jasjeet Singh Bagla*

*Indian Institute of Science Education and Research, Mohali, India*

Exploring the dependence of the parameters in the Sheth-Tormen mass function on the tilt of the power spectrum using N-body simulations, in an Einstein-de Sitter cosmology with a scale-invariant power spectrum. Report [here](#).

## D-GADGET 2 and D-N-GenIC

January 2016 - February 2016

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Independently modified the N-body simulation code GADGET-2 and the initial conditions code N-GenIC to include four parameterisations of a variable dark energy equation of state. GitHub [here](#).

### CONFERENCE TALKS

**Dissertation Talk: Hidden Sectors with Early Matter Domination** Jan 2024  
243rd Annual Meeting of the American Astronomical Society  
(abstract accepted)

**Invited Talk: Shining Light on Hidden Sector Dark Matter** Nov 2023  
Interacting dark sectors in astrophysics, cosmology, and the lab  
Online Workshop organized by the Mainz Institute for Theoretical Physics,  
Johannes Gutenberg University

**Illuminating Hidden Sectors With Early Matter Domination** Jul 2023  
GRAPPA@10 Conference, University of Amsterdam

**Effects of a Hidden Sector on the Matter Power Spectrum** Jun 2022  
XV International Conference on Interconnections between Particle  
Physics and Cosmology (PPC)

### TALKS AND SEMINARS

**Probing Hidden Sectors With Early Matter Domination** 2023  
Cosmology Seminar, Max Planck Institute for Astrophysics, Garching

**Gravitational Signatures of Hidden Sectors** 2021  
Amsterdam Journal Club, University of Amsterdam

**Impact of A Hot Hidden Sector on the Matter Power Spectrum** 2021  
Lorentz Institute, University of Leiden

**Structure Formation and Gravitational Heating In An  
Early Matter Dominated Era** 2020  
Research talk, Cosmology group, Perimeter Institute for Theoretical Physics

### SCHOOLS

**Tonale Winter School of Cosmology**, Passo del Tonale, Italy 2021

**Michigan Cosmology Summer School** 2020

**Cosmological Structure Formation** 2018  
Short course on structure formation and the halo model, by Dr. Ravi Sheth.

**Dark Matter: The Astroparticle Perspective** 2017  
Short course on dark matter particle candidates, by Dr. Subir Sarkar.

**ICTP Summer School** 2022  
Selected but did not attend.

SKILLS

Python, Julia, R, C, C++, FORTRAN, MATLAB and Simulink.

Familiar with CAMB, HMCode, Rockstar.

*N*-Body simulations with GADGET-2 and GADGET-4.

TEACHING  
EXPERIENCE

Taught and graded Astronomy Laboratory for Non-Science Majors for five semesters as a Graduate Teaching Assistant at North Carolina State University.

REFERENCES

**Dr. Katherine J. Mack**

Hawking Chair in Cosmology and Science Communication,  
Perimeter Institute for Theoretical Physics  
kmack@ncsu.edu

**Dr. Sten Delos**

Postdoctoral Fellow, Carnegie Observatories  
mdelos@carnegiescience.edu

**Dr. Weikang Lin**

Yunnan University  
weikanglin@ynu.edu.cn