

# Nirmalya Brahma

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## EDUCATION

### Ph.D. in Physics, McGill University

Thesis Advisor: Katelin Schutz

GPA: 4.0/4.0

Montréal, Canada  
Sept. 2021 – May 2026

### MS in Physics, Indian Institute of Science

Thesis advisor: Chethan Krishnan

Thesis: *A Large- $N$  phase transition in a finite lattice gauge theory*

CGPA: 9.0/10.0 (Major CGPA: 9.3/10.0)

Bangalore, India  
Aug. 2020 – Jun. 2021

### BS (Research), Major in Physics, Indian Institute of Science

Thesis advisor: Aninda Sinha

Thesis: *Bootstrapping Cosmological Correlators*

CGPA: 8.9/10.0 (Major CGPA: 9.3/10.0)

Bangalore, India  
Aug. 2016 – Jun. 2020

## FELLOWSHIPS, AWARDS, AND HONORS

**FRQNT scholarship**, Fonds de recherche du Québec

CA\$58,334/ US\$42,000 total value for 28 months

2024 – 2026

**HQP pooled resource competition**, McDonald Institute

CA\$40,000/ US\$29,000 total value for 12 months

2022 – 2024

**TSI Graduate Fellowship**, Trottier Space Institute

CA\$2,000/ US\$1,500

2021 – 2023

**Chennupati and Vidya Jagadish Visiting Scholarship**, Australian National University

Three-month research internship in stellar nucleosynthesis (AU\$ 8500/ US\$ 5,600)

2019

**INSPIRE-SHE Scholarship**, Department of Science & Technology, India

₹400,000/ US\$4,500 for a duration of 5 years

2016 – 2021

**Mamraj Agarwal National Award** (Governor's Medal)

5th rank, WBCHSE Higher Secondary Exam 2016 ( $\approx 0.78$  million candidates)

2016

## PUBLICATIONS

Primary contributor or equivalent:

7. **Nirmalya Brahma**, Ella Iles, Hugo Schérer, Katelin Schutz (Sep 2025), *Resonant axion and dark photon production in magnetic white dwarfs*, [arXiv:2509.07085](#).
6. **Nirmalya Brahma**, Saniya Heeba, Hugo Schérer, Katelin Schutz (July 2025), *Spectral Surgery in a Heat Bath: a finite-temperature guide to particle production for phenomenologists*, [arXiv:2507.14277](#).
5. **Nirmalya Brahma**, Katelin Schutz (Oct 2024), *Photon conversion to axions and dark photons in magnetized plasmas: a finite-temperature field theory approach*, *JHEP* 12 (2024) 191, [arXiv:2410.14771](#).
4. **Nirmalya Brahma**, Saniya Heeba, Katelin Schutz (Aug 2023) *Resonant pseudo-Dirac dark matter as a sub-GeV thermal target*, *Phys.Rev.D* 109 (2024) 3, 035006, [arXiv:2308.01960](#).
3. **Nirmalya Brahma**, Asher Berlin, Katelin Schutz (Aug 2023) *Photon-dark photon conversion with multiple level crossings*, *Phys.Rev.D* 108 (2023) 9, 095045, [arXiv:2308.08586](#).
2. **Nirmalya Brahma**, Chethan Krishnan (Dec 2020) *Large- $N$  phase transition in a finite lattice gauge theory*, *Phys.Rev.D* 103 (2021) 12, 126028, [arXiv:2012.15857](#).
1. **Nirmalya Brahma**, Shiv Sethi, Shivnag Sista (Jul 2020) *Energy injection in pre-recombination era and EDGES detection*, *JCAP* 12 (2020) 034, [arXiv:2007.06417](#).

## SEMINARS AND CONFERENCE TALKS

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Simons Foundation CCA PACMAN Seminar <i>"Axion and Dark Photon Emission from Magnetic White Dwarfs"</i>	New York, NY Nov 2025
The International Conference Dark Matter and Stars (ICDMS) <i>"Modified Axion and Dark Photon Emission from Magnetic Dispersion"</i>	Kingston, ON July 2025
Dark Side of the Universe (DSU) <i>"Axions from magnetized plasma: effects of plasma dispersion"</i>	Montréal, QC July 2025
Pheno Symposium <i>"Axions from magnetized plasma: effects of plasma dispersion"</i>	Pittsburgh, PA May 2025
McGill HEP Theory Journal Club Seminar <i>"Plasmon production of axions and dark photons in anisotropic plasmas"</i>	Montréal, QC Nov. 2024
61st Winter Nuclear and Particle Physics Conference (WNPPC) <i>"Photon-Dark Photon Conversion with Multiple Level Crossings"</i>	Bromont, QC Feb 2024
Pheno Symposium <i>"Dark photon conversion in the presence of multiple level crossings"</i>	Pittsburgh, PA May 2023

## SCHOOLS, WORKSHOPS, AND EXTERNAL TRAINING

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Berkeley Axion Workshop <i>Poster - "Resonance Rewritten: Magnetic Dispersion and Axion Emission Rates"</i>	Berkeley, CA May 2025
TASI: The Frontiers of Particle Theory <i>Attended summer school in theoretical particle physics at CU Boulder</i>	Boulder, CO 3-28 June 2024
GUINEAPIG Workshop, Université de Montréal <i>GeV and Under Invisibles with New Experimental Assays for Particles in the Ground</i>	Montréal, QC July 2023
Centre for Research in Astrophysics of Quebec Summer School on Cosmology <i>Hands-on experience with observational probes of cosmology</i>	Montréal, QC June 2022

## TEACHING EXPERIENCE

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### Teaching Assistant, McGill University

Topics in Classical Mechanics - PHYS 331	Winter 2025
Introductory Astrophysics - PHYS 320	Fall 2024
Particle Physics - PHYS 567	Winter 2024
Majors Quantum Physics - PHYS 346	Fall 2023
Topics in Classical Mechanics - PHYS 331	Winter 2023
Mechanics and Waves - PHYS 131	Fall 2022
The Milky Way Inside and Out - PHYS 183	Winter 2022
Astrophysics - PHYS 521	Fall 2021

## MENTORING EXPERIENCE

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### Graduate

Berkin Gürbüz, M.Sc. student at McGill University	2024 – present
Marlon Josue Rivera Valladares, M.Sc. student at McGill University	2024 – present

### Undergraduate

Ella Iles, B.Sc. student at McGill University <i>Co-supervised final year bachelor thesis</i>	2024 – 2025
Aditya Chugh, Trottier Space Institute SURA (2023) <i>Co-supervised 3 month internship project (University of Toronto → McGill University)</i>	May – Aug. 2023

**Programming Languages:** Python, C, MATLAB, LaTeX

**Computational Packages:** Mathematica, FeynCalc, OriginPro, SciDavis, ImageJ, Lumerical FDTD

**Particle & Nuclear Physics Tools:** DRAKE, QEDark, DarkART, DarkCast, NucNet Tools, r-Java 2.0, TALYS

PROFESSIONAL ACTIVITIES

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Journal referee: Journal of High Energy Physics (JHEP)	2025 – present
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EXTRACURRICULAR ACTIVITIES

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Volunteer, Dark Side of the Universe Conference	July 2025
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Volunteer, Astronomy on Tap (AoT) Montreal	2023 – present
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Co-founder and Mediator, Thermal field theory journal club (McGill University)	2022-present
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Mentor at Notebook Drive IISc	2017-2020
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