

Tatsam Garg

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EDUCATION

Technical University of Vienna, Austria <i>PhD in Physics</i>	<i>Expected 2027</i>
University of Stuttgart, Germany <i>Master's in Physics</i>	<i>2023</i>
Ashoka University, India <i>Bachelor's in Physics (Honors)</i>	<i>2021</i>
Birla Vidya Niketan, New Delhi, India <i>Central Board of Secondary Education</i>	<i>2018</i>

SELECTED AWARDS AND HONORS

Doctoral fellow Vienna Centre for Quantum science (VCQ)	<i>June 2024 - June 2027</i>
First class with distinction Master's degree, University of Stuttgart	<i>Nov 2023</i>
Master's Fellowship Fully funded masters, IMPRS-CMS, Max Planck Society	<i>Sept 2021 - Sept 2023</i>
World Rank 15 International Theoretical Physics Olympiad	<i>2021</i>
Academic Award for Physics Ashoka University	<i>Class of 2021</i>
Cum Laude Latin Honors, Ashoka University	<i>2021</i>
Dean's List 4/4 GPA, Ashoka University	<i>Monsoon Sem 2020</i>
Dean's List 3.88/4 GPA, Ashoka University	<i>Spring Sem 2020</i>
High-school Stream Topper secured highest percentage in PCB/Physical Ed. cohort	<i>2018</i>
Best Research Poster The International Conference on Nano-biotechnology for Agriculture	<i>2017</i>

CONFERENCES AND PUBLICATIONS

“Magnetically induced laser cooling of Barium Monofluoride molecules”, (with Langen group), *in preparation*.

“Laser cooling of rare isotopologue ^{136}BaF ”, (with Langen group), *in preparation*.

“A scalable scanning transfer cavity laser stabilization scheme based on the Red Pitaya STEMLab platform”, (with Langen group), <https://doi.org/10.1063/5.0169021>.

Ashoka University, Sonapat, *Invited talk*, 2024.

Molecular Quantum Science and Technology, Vienna, *Poster*, 2024.

Young Atom Opticians Conference, ICFO Barcelona, *Contribution talk*, 2023.

SAMOP, German Physical Society, *Attendee*, 2023.

International Conference on Nano-Biotechnology for Agriculture, TERI-Deakin India, *Poster presentation*, 2017.

Japan Super Science Fair, *Contribution talk and poster*, 2017

EXPERIENCE AND PROJECTS

Master's Thesis, Langen Group

Nov 2022 - Nov 2023

Towards laser cooling Barium Monofluoride molecules

- Characterized thermal properties and dynamics of the molecular beam.
- Realised and characterized long lasting optical cycling in ^{138}BaF .
- Realised laser cooling of BaF with Sisyphus-type forces for the first time.
- Demonstrated optical cycling and high fidelity imaging for rare-isotopologue ^{136}BaF for the first time.

Student Assistant, Langen Group

Apr 2022 - Nov 2022

Nitrogen-vacancy center based magnetometry

- Built a test set-up magnetometer using NV centers in Diamond.
- Involved the use of diode lasers, optics, microwave generators and fields, and SCPI based control of FPGAs.

Independent Study Module, Ashoka University

Jan 2021 - June 2021

Experimentally studying flow and instability in viscous currents on a slope

- Fluid dynamics experiments to characterise the build up and growth of instabilities in viscous fluid flows, supervised by Dr. Pramoda Kumar.
- Access the report [here](#).

Independent Project, Prof. Vikram Vyas

June 2020 - Dec 2020

Computing Monte Carlo path integrals

- Explored Monte Carlo path integral formulations for the quartic-anharmonic oscillator in the first phase of this work. Project report available [here](#).
- Extensive reading of classical string theory from undergraduate texts.
- Extensions to this work may implement the Monte Carlo approach to the classical open string Lagrangian and explore quark confinement using gauge-gravity duality.

Science communication, International Union of Biological Sciences

May 2020 - Dec 2020

Lesson plan writer and climate science education content creator for TROP ICSU

- Developed and published lesson plans and teaching modules for undergraduate and high-school teachers and students to teach Physics and Python Programming through the development of Climate Models.
- Published work [here](#) and [here](#).

Independent Project, Prof. Shivani Krishna

Dec 2019 - Jan 2020

Individual-based mathematical modelling for ecology

- Studied adaptive bee foraging behavior to stabilize rare plant species population in two-specie floral distributions
- Designed and conducted experiments. Presentation available [here](#).

Internship, Nature Conservation Foundation (NCF)

May 2019 - July 2019

Snow leopard Population Estimation in Himachal Pradesh, India

- Worked under Dr. Kulbhushansingh Suryawanshi's team for field work in camera trapping and terrain analysis, and conducted wildlife hunting and trade surveys.
- Part of a global project by the Snow Leopard Trust to estimate the global population of Snow Leopards.

Independent Project, The Energy and Resources Institute (TERI)

June 2017 - Nov 2017

Developing pectin-based complex for heavy metal removal from Wastewater

- Worked under the supervision of Dr. Nupur Mathur on developing pectin-based complexes to filter carcinogens, particularly hexavalent Chromium.
- Access poster [here](#)

POSITIONS OF RESPONSIBILITY

Deputy Head Boy, Birla Vidya Niketan

2016-17

President, Model UN society, Birla Vidya Niketan

2016-17

Head of Photography, Unbound Magazine, Birla Vidya Niketan

2016-17

TECHNICAL SKILLS AND INTERESTS

Languages: English (proficient), Hindi (native), German (beginner)

Computational Tools: Python and Matlab; Numerical simulations- ODE and PDE methods, Monte Carlo methods, regression; SCPI interface

Optics: Standard AMO lab experience - Tunable external cavity diode lasers, Ti:Sa lasers, Tapered amplifiers, modulation devices, cavities, fibre optics

Other Interests: Music - *songwriting, guitar, piano, production*; Travel - *hiking, backpacking*; Photography; Theatre; Poetry