

Research Interests    Quantum Information Science & Technology  
                                 Computational Physics: Methods and Applications

## EDUCATION & PROFESSIONAL EXPERIENCE

Postdoctoral Fellow	19.10.2025 – Present
Technion - Israel Institute of Technology, Israel	
Advisor:	Asst. Prof. David Gelbwaser-Klimovsky
Research Assistant	07.07.2025 – 03.10.2025
Indian Institute of Technology Roorkee, India	
Postdoctoral Fellow / Adiunkt	03.10.2023 – 19.04.2025
International Centre for Theory of Quantum Technologies, Poland	
Advisor:	Prof. Michał Horodecki
Ph.D. in Quantum Information Science	02.01.2018 – 13.07.2023
Indian Institute of Technology Roorkee, India	
Thesis:	Entanglement Dynamics in Quantum Continuous-Variable States <a href="https://arxiv.org/abs/2405.07362">arXiv:2405.07362</a>
Advisor(s):	Prof. P. Arumugam & Prof. Tomasz Paterek (Uni of Gdańsk, Poland)
Awarded with an “Outstanding” in Mathematical and Computational Techniques	
M.Sc. in Physics    9/10, Distinction	2015 – 2017
Indian Institute of Technology Roorkee, India	
Thesis:	A Qualitative Study of Rotating Neutron Stars
Advisor:	Assoc. Prof. P. Arumugam
Rank 10 (percentile: 99.91) in GATE, 2017    Rank 86 in CSIR-UGC JRF, June 2016	
B.Sc. (H) Physics    88/100	2012 – 2015
Hansraj College, University of Delhi, India	
Project:	Designing and Optimization of Auto-Tracking Solar energy-based Energy Conversion Module ...
Advisor(s):	Asst. Prof.(s) Amit Sehgal, Sushil Kumar, & Rajan Walia [Best Innovation Idea Award]
Sr Secondary School - XI & XII    89/100    CBSE, Baghpat 250609, India	2010 – 2012
Secondary School – IX & X    9.4/10    CBSE, Meerut 250501, India	2008 – 2010

## SPONSORED RESEARCH PROJECTS, FELLOWSHIPS & AWARDS

9. Publication Award for Article: [CQG 41, 245014 \(2024\)](#) ↔ *Uni of Gdańsk, Poland* [PLN 640]
8. Publication Award for Letter: [PRD 109, L101501 \(2024\)](#) ↔ *Uni of Gdańsk, Poland* [PLN 2250]
7. Gravitation and Entanglement in Quantum Superpositions [MSCA Proposal 2023]  
Host: Prof. Mauro Paternostro (Queen's University Belfast, UK)  
Outcome: Marie Curie Seal of Excellence (certificate not awarded due to UK-EU Brexit legalities)
6. "Pledge a Dream Grant" for research visits to Singapore and Malaysia [USD 500]  
*IIT Roorkee Heritage Foundation, USA*

5. Quantum Coherence and Nuclear Reactions [Jan 17 - May 31, 2019]  
*Nanyang Technological University, Singapore* [NTU-India Connect Research Programme]  
 Advisor: Asst. Prof. Tomasz Paterek

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4. MHRD Fellowship for Doctoral studies  $\leftrightarrow$  *MHRD, Govt. of India* [Jan 2018 - Dec 2022]

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3. Merit-cum-means Scholarship  $\leftrightarrow$  *IIT Roorkee, India* [2016 - 2017]

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2. Designing and Optimization of Auto-Tracking Solar energy-based Energy Conversion ... [Nov'13–Nov'14]  
*Dept. of Electronics, Hansraj College, Uni of Delhi, India*  
 PI(s): Asst. Prof.(s) Amit Sehgal, Sushil Kumar, & Rajan Walia  
 Funding: INR 350,000  $\leftrightarrow$  Innovation Project HR-207  $\leftrightarrow$  **Best Innovation Idea** award

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1. Central Sector Scheme Scholarship (CSSS)  $\leftrightarrow$  *CBSE & MHRD, Govt. of India* [2012-2016]

## TEACHING

3. “Introduction to Quantum Mechanics” for Postgraduates [Oct 2024 - Feb 2025]  
*University of Gdańsk, Poland*
2. Teaching assistant in “Experimental Physics for specially-abled students” [2020]  
*Indian Institute of Technology Roorkee, India*
1. Teaching assistant in Computational Physics (FORTRAN & Python) [2019-2022]  
*Indian Institute of Technology Roorkee, India*

## LIST OF PUBLICATIONS

8. Micromagnons and long-range entanglement in ferrimagnetic ground states  
 Marcin Wiśniak, **Ankit Kumar**, and Idriss H.N. Ngueya  
[Phys. Rev. B \*\*112\*\*, 134425 \(2025\)](#)
7. Open quantum dynamics of Josephson charge pumps  
**Ankit Kumar**, L. Cort, M. Łobejko, Alejandro Jenkins, Michał Horodecki  
[New Journal of Physics \*\*27\*\*, 104503 \(2025\)](#)
6. Correlations and signaling in the Schrödinger-Newton model  
**J.A. Gruca & Ankit Kumar**, R. Ganardi, P. Arumugam, K. Kropielnicka, Tomasz Paterek  
[Class. Quantum Grav. \*\*41\*\*, 245014 \(2024\)](#)
5. Probing Modified Gravity with Entanglement of Microspheres  
**Ankit Kumar**, Yen-Kheng Lim, P. Arumugam, Tom Złosnik, Tomasz Paterek  
[Phys. Rev. D \*\*109\*\*, L101501 \(2024\)](#) Letter
4. Continuous-variable entanglement through central forces: application to gravity between quantum masses  
**Ankit Kumar**, Tanjung Krisnanda, P. Arumugam, Tomasz Paterek  
[Quantum \*\*7\*\*, 1008 \(2023\)](#)
3. Pasta properties of the neutron star within effective relativistic mean-field model  
 V. Parmar, H.C. Das, A. Kumar, **Ankit Kumar**, M.K. Sharma, P. Arumugam, S.K. Patra  
[Phys. Rev. D \*\*106\*\*, 023031 \(2022\)](#)
2. Constraining the parameterized neutron star equation of state with astronomical observations  
 Jaikhomba Singha, S.M. Vaneshwar, **Ankit Kumar**  
[Res. Astron. Astrophys. \*\*23\*\*, 055001 \(2022\)](#)
1. Nonclassical trajectories in head-on collisions  
**Ankit Kumar**, Tanjung Krisnanda, P. Arumugam, Tomasz Paterek  
[Quantum \*\*5\*\*, 506 \(2021\)](#)

## SELECTED PRESENTATIONS

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|---|-----------------------------|
| 12. Energy conservation on quantum computing<br><i>NIT Delhi, India</i> ↔ STC Worskhop on Silicon to Systems                                      | Invited Talk<br>27 Aug 2025 |
| 11. Open system modeling for Josephson junction based nanodevices<br><i>IIT Roorkee, India</i> ↔ IPA Lecture Series                               | Invited Talk<br>07 Aug 2025 |
| 10. An open system approach to superconducting nanodevices<br><i>Xiamen University, Malaysia</i>  | Invited Talk<br>04 Oct 2024 |
| 9. Current pumping with an unbiased SQUID<br><i>Uni of Maryland, USA</i> ↔ QTD Conference 2024  | Poster<br>05-09 Aug 2024    |
| 8. Entanglement tests of gravity at quantum length scales<br><i>Uni of Gdańsk, Poland</i> ↔ KCIK Symposium on Quantum Information                 | Poster<br>16-18 May, 2024   |
| 7. Probing Modified Gravity with Entanglement of Microspheres<br><i>Uni of Gdańsk, Poland</i> ↔ Quantum Speedup Conference 2023                   | Talk<br>20-22 Nov 2023      |
| 6. Using Matrices to Solve the Time-Dependence of Quantum States<br><i>FCRIT - Uni of Mumbai, India</i> ↔ STTP Workshop on Quantum Computing      | Invited Talk<br>14 Jan 2023 |
| 5. Millisecond Pulsars: astrophysics Course for undergraduate students<br><i>Xiamen University, Malaysia</i>                                      | Invited Talk<br>19 Dec 2022 |
| 4. Entanglement based precision test of gravitational coupling at quantum length scales<br><i>NTU, Singapore</i> ↔ IPS Meeting 2022               | Talk<br>28-30 Sep 2022      |
| 3. Computing gravity-mediated quantum entanglement in continuous variable bipartite states<br><i>IIT Roorkee, India</i> ↔ ISRACAM Conference 2022 | Talk<br>20-24 Jun 2022      |
| 2. Quantum Dynamics of Fundamental Interactions<br><i>Chhatrasal Govt. PG College, India</i> ↔ National Webinar on Quantum Mechanics              | Invited Talk<br>19 Jan 2021 |
| 1. Closest approach of a quantum projectile<br><i>Alagappa University, India</i> ↔ ICMCMSE Conference 2022  | Talk<br>22-24 Jan 2022      |

## ACADEMIC REFEREES

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- Prof. Michał Horodecki [michal.horodecki@ug.edu.pl](mailto:michal.horodecki@ug.edu.pl)  
*International Centre for Theory of Quantum Technologies, University of Gdańsk, Poland*
- Prof. Tomasz Paterek [tomasz.paterek@ug.edu.pl](mailto:tomasz.paterek@ug.edu.pl)  
*Institute of Theoretical Physics and Astrophysics, University of Gdańsk, Poland*
- Prof. Paramasivan Arumugam [arumugam@ph.iitr.ac.in](mailto:arumugam@ph.iitr.ac.in)  
*Department of Physics, Indian Institute of Technology Roorkee, India*