

Dr. Niketan Jakhar

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Profile

- Personnel DOB: 06th November 1997, Female, Address: House No. 716, Old Rishi Nagar, Hisar, Haryana, India
- 2021-2026 **Ph.D. in Plasma and Accelerator Physics**, *Jawaharlal Nehru University*, New Delhi, India.

Education

- 2018-2020 **Masters of Physics**, *Kurukshetra University*, Haryana, .
First Class Honours
- 2015-2018 **Bachelor of Sciences**, *Kurukshetra University*, Haryana, .
First Class Honours
- 2014-2015 **Senior Secondary (Class XII)**, *Campus School CCS HAU, Hisar, Haryana*,
Central Board of Secondary Education (CBSE), .
- 2012-2013 **Secondary School (Class X)**, *Campus School CCS HAU, Hisar, Haryana*,
Central Board of Secondary Education (CBSE), .

PhD Thesis

- Title *Study of Multi Particle Beam Dynamics and Plasma Wakefield Phenomena*
- Supervisors Prof. Manish Kumar, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India
- University Jawaharlal Nehru University
- Award Date 01 June 2026
- Description Design and multi-particle beam dynamics studies of accelerator components, including a novel electrostatic accelerating tube, electrostatic low-energy beam transport (LEBT) system, and Wien filter. Also studied plasma instabilities in a 10 GHz NANOGAN Electron Cyclotron Resonance (ECR) ion source experimentally, and plasma wakefield acceleration using particle in cell codes.

Research Experience

- 2021-Present Published 6 peer-reviewed publications in international journals.
- 2021-Present Performed design and beam dynamics simulations of accelerator components, including a novel electrostatic accelerating tube (EAT), electrostatic low-energy beam transport (ELEBT) system for LINAC4 at CERN, and Wien filter. Also conducted simulation studies of plasma wakefield acceleration.
- 2023-Present Utilized the PARAM Rudra High Performance Computing (HPC) facility at IUAC for large-scale simulations and demonstration studies of plasma wakefield acceleration
- 2024 Participated in accelerator-based experiments at the Inter-University Accelerator Centre (IUAC), New Delhi
- 2024 Conducted experimental measurements, data acquisition, and data analysis using accelerator beam facilities at IUAC, New Delhi

Grants/Projects

- 2025 **International Beam Time** approved at GSI, Germany (P-24-00240)
- 2025 **Beam Time** sanctioned at IUAC, New Delhi, for the investigation of plasma wakefield phenomena (Ref. No. 77218).
- 2026 **Student Grant** awarded to attend the 17th International Particle Accelerator Conference (IPAC 2026).

Awards

- 2022 Qualified-Graduate Aptitude test in Engineering (GATE)
- 2021 Qualified-Jawaharlal Nehru University Entrance Exam (JNUEE)
- 2025 Qualified for CSIR-Senior Research Fellowship (SRF) through Direct Interview

Scientific Visits

- 2026 Research visit to CERN, Geneva, Switzerland; visited LINAC4, EBIS ion source and other facilities.

Professional Activities

- 2024 Invigilator, Vidyarthi Vigyan Manthan (VVM)
- 2026 Co-Chair, Technical Session, International Particle Accelerator Conference (IPAC 2026)
- 2026 Peer Reviewer, International Particle Accelerator Conference (IPAC 2026)

Computer skills

Basic	Mathematica, Python, CST MWS, COMSOL-Multiphysics
Intermediate	LaTeX, Linux, Microsoft Windows
Advanced	Beam optics and Particle-in-cell (PIC) codes such as TRANSPORT (SLAC / Fermilab / CERN), COSY Infinity (Michigan State University, USA), TRAVEL (CERN, Switzerland), TRACK (ANL, USA), EPOCH (University of Warwick, UK), LCODE (NSU, Russia), WARP (LBNL, USA), POISSON/SUPERFISH (LANL, USA), OSIRIS (UCLA, USA and IST, Portugal), Xsuite (CERN, Switzerland)

Membership of Academic Societies

- 2022 Plasma Science and Society of INDIA (PSSI), Reference No. LM 1843
- 2022 Vigyan Bharati, INDIA (VIBHA)

Journal Publications

1. Design and optimization of electrostatic low energy intense beam transport for H^- ion source in LINAC4 at CERN, **Niketan Jakhar**, Sarvesh Kumar, Chandan Thakur, Sandeep Kashyap, Jyotsna Sharma, Manish K. Kashyap and Alessandra Lombardi, Journal of Instrumentation, 2025, DOI: 10.1088/1748-0221/20/03/P03015
2. Novel electrostatic accelerating modular tube without gap insulators for Pelletron accelerators, **Niketan Jakhar**, Sarvesh Kumar, Chandan Thakur, Sandeep Kashyap, Jyotsna Sharma, and Manish K. Kashyap, Physica Scripta, 2025, DOI: 10.1088/1402-4896/ae01f0
3. Design of a Pelletron accelerator using a novel electrostatic accelerating tube without gap insulators, **Niketan Jakhar**, Sarvesh Kumar, Chandan Thakur, Sandeep Kashyap, Jyotsna Sharma, and Manish K. Kashyap, Journal of Physics: Conference Series, 2025, DOI: 10.1088/1742-6596/3094/1/012026
4. Numerical simulations of Wien Filter for longitudinal phase space characterization, **Niketan Jakhar**, Sarvesh Kumar, Chandan Thakur, Rimsha Arif, Manya Yadav, Sandeep Kashyap, Manish K. Kashyap, and Jyotsna Sharma, DOI: 10.1088/1402-4896/ae964b
5. Low Frequency Curvature Driven Interchange Instabilities in Electron Cyclotron Resonance Ion Sources, **Niketan Jakhar**, Sarvesh Kumar, Chandan Thakur, Sandeep Kashyap, Jyotsna Sharma, and Manish K. Kashyap, Submitted in Physical Review Accelerators and Beams (Ref:ZM10236)
6. Beam dynamics design and optimization of a standalone radio frequency quadrupole accelerator for swift heavy ions, Sruthy Varma Koyickal, Sarvesh Kumar **Niketan Jakhar**, Chandan Thakur, Manish K. Kashyap and Alessandra Lombardi, Physica Scripta, 2024, DOI: 10.1088/1402-4896/ad9e37
7. Beam driven plasma instabilities in electron beam ion sources, Chandan Thakur, **Niketan Jakhar**, Sarvesh Kumar, Sandeep Kashyap, Jyotsna Sharma, Manish K. Kashyap, Hannes Pahl, and Fredrik Wenander, Physical Review Accelerators and Beams, 2025, DOI: <https://doi.org/10.1103/pvn5-92v5>

Papers in International / National Conferences

1. Multiparticle beam dynamics of ELEBT integrated with upgraded RFQ in LINAC4, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, Proceedings of the 17th International Particle Accelerator Conference (IPAC 2026), Deauville, Normandy, France, May 17-22, 2026, Ref: THP5617.
2. Design of Pelletron Accelerator Using Novel Accelerating Tube Without Gap Insulators, **Niketan Jakhar**, Chandan Thakur, Manish K. Kashyap, Sarvesh Kumar, Sandeep Kashyap, Jyotsna Sharma, Proceedings of the 16th International Particle Accelerator Conference (IPAC 2025), Taipei, Taiwan, June 1-6, 2025, DOI: 10.18429/JACoW-IPAC2025-TUPS140.
3. A Standalone Radio Frequency Quadrupole Accelerator for Swift Heavy Ions, Sarvesh Kumar, **Niketan Jakhar**, Chandan Thakur, M. K. Kashyap, S. V. Koyickal, Alessandra Lombardi, Proceedings of the 16th International Particle Accelerator Conference (IPAC 2025), Taipei, Taiwan, June 1-6, 2025, DOI: 10.18429/JACoW-IPAC2025-TUPS045.
4. Theoretical Investigation of Interactions of Kr and Xe Ions with Al Foils, **Niketan Jakhar**, Chandan Thakur, Jyotsna Sharma, Sarvesh Kumar, Manish K. Kashyap, Proceedings of ECRIS 2022 Conference, JACoW Publishing, IPR Gandhinagar, India, Paper ID: FRP2PG028.
5. Charge State Stripping and Stopping Power Analysis of Lead Ions in Carbon Foils, Chandan Thakur, **Niketan Jakhar**, Jyotsna Sharma, Sarvesh Kumar, Manish K. Kashyap, Proceedings of ECRIS 2022 Conference, JACoW Publishing, IPR Gandhinagar, India, Paper ID: FRP2PG023.
6. Study of Plasma Wakefields Generation and Acceleration for Charged Particles Using LCODE, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish Kumar Kashyap, 37th National Symposium on Plasma Science & Technology (PLASMA 2022), Indian Institute of Technology Jodhpur, India Poster Presentation (Abstract ID=468).
7. Plasma Wakefield Acceleration of Electron Beams Using LCODE: The AWAKE Conceptual Study, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, 3rd International Conference on Plasma Theory and Simulations 2023, School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India, Poster Presentation (Poster ID=PS125).
8. Design of Electrostatic Accelerating Tubes for Beam Acceleration in Particle Accelerators, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Sandeep Kashyap, Jyotsna Sharma, Manish K. Kashyap, 10th Plasma Science Society of India-Plasma Scholars' Colloquium 2024, Indian Institute of Technology, New Delhi, India Poster Presentation (Abstract ID=153).
9. Multiparticle Beam Dynamics Design Studies of ELEBT for LINAC4 at CERN, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, 8th International Symposium on Promises and Challenges in Plasma Sciences, Department of Physics and Astrophysics University of Delhi, Delhi, India, April 29–30, 2024, Poster Presentation.
10. Design and Optimization of All Permanent Magnet-Based Electron Cyclotron Resonance Ion Source, Sandeep Kashyap, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, 10th Plasma Science Society of India – Plasma Scholars' Colloquium 2024, Poster Presentation (Abstract ID=154).

11. Plasma Instabilities in ECR Ion Sources, Shruty Verma, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, 10th Plasma Science Society of India-Plasma Scholars' Colloquium 2024, Poster Presentation (Abstract ID=155).
12. Design of an Indigenous Static Hall Thruster for Space Applications, Paras Joshi, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, 10th Plasma Science Society of India – Plasma Scholars' Colloquium 2024, Poster Presentation (Abstract ID=157).
13. Design of an Indigenous Electron Beam Ion Source for Highly Charged Heavy Ions, Chandan Thakur, **Niketan Jakhar**, Sarvesh Kumar, Sandeep Kashyap, Jyotsna Sharma, Manish K. Kashyap, 10th Plasma Science Society of India-Plasma Scholars' Colloquium 2024, Poster Presentation (Abstract ID=156).
14. Particle-in-Cell Simulations of Laser Wakefield Plasma Acceleration, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Jyotsna Sharma, Manish K. Kashyap, Proceedings of INPAC 2025, RRCAT Indore, Paper ID: 750, Page 191.
15. Design and Simulation of 10 GHz ECR Ion Source Using All Permanent Magnets, Sandeep Kashyap, Sarvesh Kumar, Chandan Thakur, **Niketan Jakhar**, Jyotsna Sharma, Manish K. Kashyap, Sanjeev Kumar Chauhan, Proceedings of INPAC 2025, RRCAT Indore, Paper ID: 760, Page 264.
16. 2D and 3D Simulation of a Standalone Swift Heavy Ion Radio Frequency Quadrupole Accelerator, Sruthy Varma Koyickal, Sarvesh Kumar, **Niketan Jakhar**, Chandan Thakur, Sandeep Kashyap, Jyotsna Sharma, Manish K. Kashyap, Proceedings of INPAC 2025, RRCAT Indore, Paper ID: 898, Page 373.
17. Beam Dynamics Study of Accelerated Beam in Laser Wakefield Acceleration, **Niketan Jakhar**, Chandan Thakur, Sarvesh Kumar, Manish K. Kashyap, PLASMA 2025 Conference, Indian Institute of Technology Tirupati, India December 27-29, 2025, Poster Presentation, Poster ID: PTA_P_74.

Workshops/Courses/Seminars Attended

1. **One-Day Interaction Session on Plasma Physics**, held on June 11, 2022, at the Indian Institute of Technology Delhi, Hauz Khas, New Delhi-110016, India, organized by the Department of Science and Technology (DST), Government of India, under the Scientific Social Responsibility (SSR) initiative.
2. **Online Workshop on Recent Developments in Plasma-Based Ion Sources for Accelerators and Associated Physics Programmes**, held during August 16-17, 2022, organized by the Inter-University Accelerator Centre (IUAC), Aruna Asaf Ali Marg, New Delhi-110067, India.
3. **International Workshop on Accelerators and Plasmas for Research and Mankind**, held on September 16, 2022, organized by the Department of Physics, Amity School of Applied Sciences, Amity University Haryana (AUH), Panchgaon, Manesar, Gurugram-122413, Haryana, India.
4. **Ph.D. Teaching Programme Module: Beam Optics and Beam Transport (Module No. 626C)**, conducted during November 10- December 15, 2023, organized by the Inter-University Accelerator Centre (IUAC), Aruna Asaf Ali Marg, New Delhi-110067, India.