

Curriculum Vitae: Amitkumar Patel

Contact Information:

Amitkumar Patel

Assistant Professor

Government Science College

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Personal Details:

Date of Birth: 01 August 1986

Sex: Male

Marital Status: Married

Nationality: Indian

Languages: English (Business Proficiency), Gujarati, Hindi

Career Objective:

To further develop my research career in experimental plasma science and technology, and contribute to innovative and challenging projects in this field.

Research Interests:

Plasma Sources and Applications, Plasma Diagnostics, Plasma Waves and Instabilities, Plasma Spectroscopy, RF Plasma sources, Microwave Plasma Sources

Education:

- Ph.D. in Experimental Plasma Physics, Institute for Plasma Research, Gandhinagar, India (2012-2019)
Thesis: Study of plasma in a versatile multi-pole line cusp magnetic field
Advisor: Dr. N. Ramasubramanian
- M.Phil. in Condensed Matter Physics, Sardar Patel University, India (2009-2010)
- M.Sc. in Solid State Physics, Sardar Patel University, India (2007-2009)

Experimental Skills:

- Design, fabrication, and operation of ultra-high vacuum systems
- Development of multi-pole cusp magnetic field devices
- Simulation and validation using FEMM and COMSOL
- Design and development of plasma diagnostics: Langmuir probes, Mach probes, B-dot probes, emissive probes
- Development of RF plasma sources and contact ionization sources for Cesium plasma

Computational Skills: MATLAB, Python, Origin, FEMM, COMSOL, FORTRAN, CST

Teaching and Research Experience:

- Assistant Professor, Government Science College, Gandhinagar
- Assistant Professor (In research), Institute of Plasma Physics and Laser Micro fusion, 23 Hery, Warsaw, Poland
- Postdoctoral Fellow, Institute for Plasma Research, Gandhinagar, India
- Laboratory Assistant, IIT Gandhinagar
- Assistant Professor, Shree Satsangi Sanketdham Institute
- Project Fellow, Department of Physics, Saradar Patel University, Gujarat, India

Selected Publications:

1. *"A new multi-line cusp magnetic field plasma device (MPD) with variable magnetic field"* Rev. Sci. Instrum. **44**, 726 (2018)
2. *"Experimental observation of drift wave turbulence in an inhomogeneous six pole cusp magnetic field"* Phys. Plasmas **25**, 112114 (2018)
3. *"Characterization of Argon Plasma in a variable Multi - pole line Cusp Magnetic Field (VMMF) Configuration"* Phys. Scr. **95**, 035602 (2020)
4. *"Evidence for neutrals carrying ion-acoustic wave momentum in a partially ionized plasma"* Phys. Plasmas **27**, 022120 (2020)
5. *"Role of multi-cusp magnetic field on plasma containment"* Plasma Res. Express **2**, 045001 (2020)
6. *"Electronegative magnetized plasma sheath properties in the presence of non-Maxwellian electrons with a homogeneous ion source"* Plasma Phys. Control. Fusion **62** 115011 (2020)
7. *"Coaxial tungsten hot plate-based cathode source for cesium plasma production confined in MPD device"* IPR/Lib./T.R. 676 (2022)
8. *"Finite element simulation for validation of multi-dipole line cusp magnetic field configuration for MPD"* IPR/Lib./T.R. 679 (2022)
9. *"Behavior of ion acoustic solitons in a two-electron temperature plasma of a multi-pole line cusp plasma device (MPD)"* AIP Advances **13**, 065021 (2023)
10. *"Characterization of Plasma Discharge in a Multi Dipole Line Cusp Magnetic Field Created by an RF Source Coupled by a Spiral Antenna"* IEEE Transactions on Plasma Science **51**, 625 (2023)
11. *"Ion flow and dust charging at the sheath boundary in dusty plasma with an electron-emitting surface: applications to laboratory and lunar dusty plasmas"* Plasma Phys. Control. Fusion **66**, 055013 (2024)

Conference Presentations and Posters:

- EASW-9, Nagoya University, Japan, (2019)
- FPPT-9, Srilanka (2019)
- IAEA Fusion Energy Conference, Indai (2018)
- EPS Conference on Plasma Physics, Queen's University, Belfast, UK (2017)

Workshops Attended:

- East Asia School on Laboratory and Astrophysical Plasma, Nagoya University, Japan (2019)
- DST-SERB School on Tokamaks & Magnetized Plasma Fusion, IPR India (2013)

Professional Memberships:

- Member, European Physical Society (EPS), France
- Life Member, Plasma Science Society of India (PSSI)

References:

- Dr. N. Ramasubramanian, Institute for Plasma Research (mani@ipr.res.in)
- Prof. R. Ganesh, Institute for Plasma Research (ganesh@ipr.res.in)
- Prof. Raj Singh, Institute for Plasma Research (raj@ipr.res.in)
- Dr. Kshitij Barada, University of California, Los Angeles (kshphy@gmail.com)

Research, Innovation and Extension Grant to Government Colleges

The research project titled "**Analytical Study of Equation of State and Thermodynamic Properties of Transition Metal Carbides under Extreme Conditions**" was sanctioned under the **Research, Innovation and Extension Grant to Government Colleges** scheme by the **Knowledge Consortium of Gujarat (KCG), Ahmedabad**, with a total grant of **₹1.50 lakh per project**. One of the two projects, is being carried out at **Government Science College, Gandhinagar** under the guidance of **Dr. Amitkumar Patel**, who serves as assistant professor in department of Physics, GSC Gandhinagar and also as a **Principal Investigator** for the aforesaid project.

This project focuses on the study of Equation of State and Thermodynamic Properties of Transition Metal Carbides under Extreme Conditions with significant applications in nuclear reactor technology, aerospace etc. It aims to strengthen research activities within the institution while contributing to the advancement of scientific knowledge.

As part of this research initiative, **Baldaniya Bhavyesh N.** and **Od Kishan T.**, students of **Government Science College, Gandhinagar**, have been selected to work on the project. Their participation provides valuable exposure to research methodology, scientific data analysis and problem-solving, fostering a strong foundation for future academic and research pursuits.

The sanction of the **₹1.50 lakh for this project (total grant received by the college is 5 lacs for research and extension activities)** grant by the **Knowledge Consortium of Gujarat (KCG), Ahmedabad** is a significant milestone for **Government Science College, Gandhinagar**. It reflects the institution's growing emphasis on research, innovation and academic excellence while encouraging meaningful collaboration between faculty members and students to cultivate a vibrant research culture.

