

## Faculty Profile



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**Designation** : Assistant Professor  
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### Qualifications

Post doctorate (Institute for Plasma research, Gujarat)  
Ph.D. in Physics (Institute of Advanced Study in Science and Technology, Guwahati)  
M.Sc. in Physics (Gauhati University)

### Areas of Interest/Specialization

- Nonlinear dynamics in Plasma
- Experimental Plasma
- Atmospheric Pressure Plasma
- Plasma Diagnostics

### Experiences

1. 3 years experience of post doctoral research in plasma diagnostics.
2. Associated with USTM as an Assistant Professor since August 2023.

### Achievements

1. Best poster prize in 2<sup>nd</sup> National Symposium on Nonlinear and Complex Phenomenon held at IASST, Guwahati during 26-28 March 2015.
2. Best poster award (Basic Plasma Section) in 30<sup>th</sup> National Symposium on Plasma Science and Technology held at SINP, Kolkata during 1-4 December 2015.
3. CSIR-SRF Award in April 2018 from Council of Scientific & Industrial Research, Govt. of India, New Delhi.
4. Best Poster award in 12<sup>th</sup> International Conference on Plasma Science and Applications (ICPSA-2019) held at Lucknow University, India during 11-14 November, 2019.

### Projects associated with

June 2020- June 2023: Post doctorate on **“The tomographic diagnostic of Helicon Experiment for Negative Hydrogen Ion (HELEN) device”** at Institute for Plasma Research, Gandhinagar, Gujarat, India.

May 2014-September 2019: Ph.D. on **“Studies on the characteristics of Peregrine soliton in multicomponent plasma with negative ions”** at Institute of Advanced Study in Science and Technology, Guwahati, Assam, India.

September 2013-April 2014: JRF on Project entitled **“Investigation on rogue wave in multicomponent plasma with negative ions”** at Institute of Advanced Study in Science and Technology, Guwahati, Assam, India.

### Mentorship:

### Ph.D. Thesis:

1. Ms. Chandrika Barman, ongoing

### M.Sc. dissertations:

1. *Characteristics of modified Korteweg - de Vries (KdV) solitons in multicomponent plasma with negative ions*, Pratima Borah, 2015, Gauhati University
2. *Plasma Sheath Characteristics in a magnetized plasma*, M. Akand, Omar F. Siddique and S. Ahmed Laskar, 2024, USTM.
3. *Influence of Glow discharge plasma on the surface morphology of GdVO<sub>4</sub> thin films*, Mehebur Rahman. 2025.

### Peer Reviewed Publications

1. **Pallabi Pathak**, S. K. Sharma, Y. Nakamura and H. Bailung, "Observation of Second Order Ion Acoustic Peregrine Breather in Multicomponent Plasma with Negative Ions", *Physics of Plasmas* **22** 022107, 2016.
2. **Pallabi Pathak**, S. K. Sharma, Y. Nakamura and H. Bailung, "Observation of Ion Acoustic Multi-Peregrine Solitons in Multicomponent Plasma with Negative Ions", *Physics Letters A* **381** 4011, 2017.
3. **Pallabi Pathak**, "Ion Acoustic Peregrine Soliton under Enhanced Dissipation", *Frontiers in Physics* **8** 603221, 2021.
4. **Pallabi Pathak** and M. Bandyopadhyay, "Parametric Investigation for Modulation Instability of Ion Wave in Negative Ion Plasma Sources", *Physica Scripta*, **96** 115601, 2021.
5. **Pallabi Pathak** and H. Bailung, "Experiments on Large Amplitude Ion Acoustic Shock Wave in a Multicomponent Plasma", *IEEE Transactions on Plasma Science*, **53**, 3-9, 2025

### Book Chapters

1. Pallabi Pathak, Chapter: "**An Introduction to Plasma Waves**, **Book: Plasma science: An introduction and its applications**", Editor: Prof. Joyanti Chutia, Former director and Emeritus Scientist, Institute of Advanced Study in Science and Technology, ISBN: 978-93-88645-62-1
2. Pallabi Pathak, Chapter: "**Solitons in Plasma**, **Book: An Introduction to Plasma and Fusion Science**", Editor: Dr. Partha Saikia, Assistant Professor, Joya Gogoi College, Golaghat, Assam, Publisher: Akinik Publications, New Delhi, ISBN: 978-93-90420-21-6

### **Presentations in National/International Conferences:**

1. P. Pathak, S. K. Sharma and H. Bailung, "*Observation of high amplitude ion acoustic Peregrine soliton in multicomponent plasma with negative ions*" 29<sup>th</sup> National symposium on Plasma Science and Technology held at M. G. University, Kottayam during 8-11 December 2014.
2. P. Pathak, S. K. Sharma and H. Bailung, "*Characteristics of high amplitude ion acoustic Peregrine soliton in multicomponent plasma with negative ions*" 2<sup>nd</sup> National symposium on Nonlinear and Complex Phenomenon held at IASST, Guwahati during 26-28 March 2015. (Best Poster)
3. P. Pathak, S. K. Sharma and H. Bailung, "*Observation of ion-acoustic Kuznetsov-Ma soliton in multicomponent plasma with critical concentration of negative ions*" 30<sup>th</sup> National symposium on Plasma Science and Technology held at SINP, Kolkata during 1-4 December 2015. (Best Poster)
4. P. Pathak, S. K. Sharma and H. Bailung, "*Super rogue wave in plasma*" 10<sup>th</sup> Asia Plasma & Fusion Association conference held at IPR, Gandhinagar during 14-18 December 2015.
5. P. Pathak, S. K. Sharma and H. Bailung, "*Rogue waves in plasma*" 62<sup>nd</sup> Annual Technical session of Assam Science Society and national seminar on "Science and Technology for Human Welfare", February 27, 2017.
6. P. Pathak, S. K. Sharma and H. Bailung, "*Observation of high amplitude ion-acoustic shock in multicomponent plasma with negative ions*" 32<sup>nd</sup> National symposium on Plasma Science and Technology held at IPR, Gandhinagar during 7-10 November 2017.
7. P. Pathak, S. K. Sharma and H. Bailung, "*Observation of Rogue Waves in Multicomponent Plasma*" National Conference on Recent Advances in Science and Technology (NCRAS-2018) held at Assam Science and Technology University, Guwahati, Assam during 15 – 17 March, 2018.
8. P. Pathak and H. Bailung, "*Ion Acoustic Peregrine Soliton under Enhanced Dissipation*" 12<sup>th</sup> International Conference on Plasma Science and Applications (ICPSA-2019) held at Lucknow University, India during 11-14 November, 2019. (Best Poster)

### **Workshop/School attended:**

1. DST-SERB School on "PLASMA THEORY" held at IASST, Guwahati during 9 – 29 November 2016.
2. 3<sup>rd</sup> ASEAN School on Plasma and Nuclear Fusion (ASPNF) held at Kasetsart University, Bangkok during January 30 – February 3, 2017.
3. "One-Day Workshop on Vacuum Technology and its Application in Optical Science" held at IIT Guwahati on 19th August 2017.
4. DST-SERB School on PLASMA DEVICES: SCIENCE & TECHNOLOGY" held at CEERI, Pilani, Rajasthan during 04 – 22 December, 2017.

### **Programming proficiency**

- ✓ Matlab
- ✓ Mathematica
- ✓ Python
- ✓ Fortran-90

### **Professional affiliation**

1. Member of “ Association of Asia Pacific Physical Societies – Division of Plasma Physics (AAPPS-DPP)”
2. Life member of “Plasma Science Society of India”
3. Life member of “Physics Academy of North-East”.

### **Participation in Faculty Development Program:**

1. Participated and successfully completed the Faculty Development Program on “*Mentoring Pedagogy and Classroom Delivery Technique*” 2024, Organized by AIU, USTM and AIDC.