Dr. Pankaj Kumar Shaw | Curriculum vitae
Assistant Professor
Raja Peary Mohan College
Uttarpara, Hooghly, West Bengal-712258, India
Email : pankaj.shaw05@gmail.com, Mobile : +91-9804749860

Education

Saha Institute of Nuclear Physics, HBNI, Kolkata, India August 2012 – September 2017
Ph.D. in Physics Supervisor: Prof. M. S. Janaki

Indian Institute of Technology (IIT), Kharagpur, India July 2010 – June 2012
Master of Science in Physics Overall CGPA: 9.3/10

Research Interests

Complex system and Nonlinear Dynamics: Plasma, Electronics, Nonlinear Time Series Analysis, Complex Dynamics, Characterization of dynamical system, Modeling of dynamical phenomena using differential equations.
Experimental Physics: Plasma and Electronics.
Plasma Physics: Low temperature Plasma, Glow discharge Plasma, Magnetron Sputtering Device.
Theoretical Studies: Dynamical Systems, Charge particle acceleration in chaotic magnetic field.

Research Positions

Postdoctoral Fellow, Jacob Blaustien Institute for Desert Research, Ben Gurion University, Israel
October 2018 – December 2019

Advisers: Prof. E. Meron & Dr. Roiy Sayag
Project: Synchronization pattern in forced ecological system

Postdoctoral Fellow, Institute for plasma Research (IPR) Gandhinagar
October 2017 – September 2018

Advisers: Prof. S. Mukherjee
Project: Nonlinear dynamical characterization of plasma sources and its possible technological application

Graduate Student, Saha Institute of Nuclear Physics August 2012 – September 2017
Advisers: Prof. M. S. Janaki
Thesis: Investigation of nonlinear dynamics of a self-excited complex system like plasma

Masters Student, Indian Institute of Technology (IIT) Kharagpur July 2010 – June 2012
Adviser: Prof. A. K. Singh
Thesis: Shell model calculation near Z=50 shell Gap

Summer Intern, Saha Institute of Nuclear Physics Summer, 2011
Supervisor: Prof. A. K. Sen
Title: Nonlinear response, semi-classical percolation and breakdown in RRTN model.

Research Recognition

- **Physics Today:** The paper entitled as *A localized cathode glow in the presence of a bar magnet and its associated nonlinear dynamics*, authored by Pankaj Kumar Shaw, S. Samanta, D. Saha, S. Ghosh, M. S. Janaki and A. N. S. Iyengar, Physics of Plasmas, 24, 082105 (2017) was highlighted in *Physics today July 2017 edition.*
- **Featured article:** The paper entitled as *A localized cathode glow in the presence of a bar magnet and its associated nonlinear dynamics*, authored by Pankaj Kumar Shaw, S. Samanta, D. Saha, S. Ghosh, M. S.

Janaki and A. N. S. Iyengar, Physics of Plasmas, 24, 082105 (2017) was selected as *Featured article in Physics of Plasmas*.

Academic Achievements

- Ranked amongst the top 2% (All India Rank 65) physics's students in the IIT-Joint Admission Test for M. Sc. 2010
- Ranked amongst the top 1% (All India Rank 20) physics's students in Graduate Aptitude Test Engineering for M. Tech. 2012
- Ranked amongst the top 1% (All India Rank 30) physics's students in CSIR-National eligibility test for Junior Research Fellow and Lectureship 2012

Awards and Honors

- **Ben-Gurion University of Negev, Israel**, BCSC, BIDR fellowship for Postdoctoral studies (2018).
- **DST, Govt. of India, Young scientist travel award** to visit 9th International Conference on Chaotic Modeling and Simulation, CHAOS 2016, London, UK, (2016).
- 3rd best **oral presentation award** in PSSI Plasma Scholars Colloquium (2015), Jadavpur University, Kolkata, India.
- Selected for **DST-SERC School on Nonlinear Dynamics**, Punjab University, India, (2014).

Technical strength

Computation language: C, Fortran, MATLAB, Python
Software & Tools: Origin, LaTex, MATCONT
Time Series analysis toolbox: TISEAN

Publications

Journal Papers

1. Gopikishan Sabavath, **Pankaj Kumar Shaw**, AN Sekar Iyengar, I Banerjee, SK Mahapatra,"Investigation of non linear dynamics of an excitable magnetron sputtering plasma", Results in Physics 12, 1814 (2019).

2. Subha Samanta, **Pankaj Kumar Shaw**, M S Janaki and A N Sekar Iyengar, "Order to chaos transitions in damped KdV equation modeled as a jerk equation", Physica Scripta 94, 4 (2019).

3. **P. K. Shaw**, N. Chaubey, S. Mukherjee, M. S. Janaki, A. N. S. Iyengar, "A continuous transition form chaotic bursting to chaotic spiking in a glow discharge plasma and its associated long range correlation behaviour to anti correlation behaviour", Physica A, 553, 126-134 (2019).

4. D. Saha, Sabuj Ghosh, **P. K. Shaw**, M. S. Janaki, A. N. Sekar Iyengar, " Interplay of transitions between oscillations with emergence of fireballs and quantification of phase coherence, scaling index in a magnetized glow discharge plasma in a toroidal assembly", Chaos, Solitons & Fractals 106, 295 (2018).

5. D. Saha, **P. K. Shaw**, Sabuj Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Quantification of scaling exponent with Crossover type phenomena for different types of forcing in DC glow discharge plasma", Physica A 490, 310 (2018).

6. **P. K. Shaw**, S. Samanta, D. Saha, S. Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "A localized cathode glow in the presence of a bar magnet and its associated nonlinear dynamics", Physics of Plasmas 24, 082105 (2017).

7. **P. K. Shaw**, D. Saha, S. Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Investigation of multifractal nature of floating potential fluctuations obtained from a dc glow discharge magnetized plasma", Physica A 469, 363 (2017).

8. D. Saha, **P. K. Shaw**, Sabuj Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Investigation and quantification of phase coherence index for different types of forcing in DC glow discharge plasma", Chaos, Solitons & Fractals 104, 173 (2017).

9. S. Samanta, **P. K. Shaw**, M. S. Janaki, and B. Dasgupta, "Energization of charged particles in regular and chaotic magnetic fields", Physics of Plasmas 24, 054506 (2017).

10. D. Saha, **P. K. Shaw**, S. Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Evidence of nonlinearity in presence of external forcing and magnetic field in a glow discharge plasma", Chaos, Solitons & Fractals 98, 46 (2017).

11. **P. K. Shaw**, S. Ghosh, D. Saha, M. S. Janaki, A. N. Sekar Iyengar, "Investigation of coherent modes and their role in intermittent oscillations using empirical mode decomposition", Physics of Plasmas, 23, 112103 (2016).

12. S. Ghosh, **P. K. Shaw**, D. Saha, M. S. Janaki, A. N. Sekar Iyengar, "Hysteresis of fluctuation dynamics associated with a fireball in a magnetized glow discharge plasma in a currentless toroidal assembly", Physics of Plasmas 23, 093511 (2016).

13. **P. K. Shaw**, D. Saha, S. Ghosh, M. S. Janaki, and A. N. S. Iyengar, "Intrinsic noise induced coherence resonance in glow discharge plasma", Chaos, 25, 043101 (2015).

14. **P. K. Shaw**, A. N. S. Iyengar, Md Nurujjaman, "Canard and mixed mode oscillations in an excitable glow discharge plasma in the presence of inhomogeneous magnetic field", Physics of Plasmas 22, 122301 (2015).

15. **P. K. Shaw**, M. S. Janaki, A. N. S. Iyengar, Tanu Singla, P. Parmananda,"Antiperiodic Oscillations (APOs) in a Forced Duffing Oscillator", Chaos, Solitons & Fractals 78, 256 (2015).

16. **P. K. Shaw**, D. Saha, S. Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Investigation of coherent modes in the chaotic time series using empirical mode decomposition and discrete wavelet transform analysis", Chaos, Solitons & Fractals 78, 285 (2015).

17. S. Ghosh, **P. K. Shaw**, A. N. S. Iyengar, M. S. Janaki, D. Saha, A. M. Wharton, V. Mitra, "Irregular-regular-irregular mixed mode oscillations in a glow discharge plasma", Physics of Plasmas 22, 052304 (2015).

18. D. Saha, **P. K. Shaw**, S. Ghosh, M. S. Janaki, A. N. Sekar Iyengar, "Investigation and quantification of nonlinearity using surrogate data in a glow discharge plasma", Physics of Plasmas 21, 032301 (2015).

19. Gopi Kishan Sabavath, **P. K. Shaw**, A. N. S. Iyengar, I Banerjee, S Mahapatra,"Experimental investigation of quasi periodic-chaotic-quasi periodic-chaotic transition in a DC magnetron sputtering plasma", Physics of Plasmas 22, 082121 (2015).

20. A. M. Wharton, **P. K. Shaw**, M. S. Janaki, Awadhesh Prasad, and A. N. Sekar Iyengar, "Theoretical and numerical modelling of chaotic electrostatic ion cyclotron (EIC) oscillations by Jerk equation", Physics of Plasmas 21, 022311 (2014).

21. D. Saha, **P. K. Shaw**, M. S. Janaki, A. N. Sekar Iyengar, S. Ghosh, V. Mitra, A. M. Wharton, "Investigation of complexity dynamics of inverse and normal homoclinic bifurcation in a glow discharge plasma", Physics of Plasmas 21, 032301 (2014).

22. S. Ghosh, **P. K. Shaw**, A. N. S. Iyengar, M. S. Janaki, D. Saha, A. M. Wharton, V. Mitra, "Experimental evidence of intermittent chaos in a glow discharge plasma without external forcing and its numerical modelling", Physics of Plasmas 21, 032303 (2014).

23. V. Mitra, A. Sarma, M. S. Janaki, A. N. S. Iyengar, B Sarma, Norbert Marwan, Jurgen Kurths, **P. K. Shaw**, D. Saha, S. Ghosh, "Order to chaos transition studies in a DC glow discharge plasma by using recurrence quantification analysis", Chaos, Solitons & Fractals 69, 285 (2014).

Conference and Seminar Presentations, Schools and Workshops Attended

Conference Presentations

1. 32^{nd} National Symposium on Plasma Science & Technology
   Institute for Plasma Research, Gandhinagar, Gujarat, India. November 2017
   Title: A localized cathode glow in presence of a bar magnet and its associated nonlinear dynamics

2. Seminar on recent development in plasma physics
   Jadavpur University, Kolkata, India. February 2017
   Title: Investigation of coherent modes and their role in intermittent oscillations using empirical mode decomposition.

3. 10^{th} Conference on Nonlinear Systems and Dynamics (CNSD)
   IISER Kolkata, Kolkata, India. December 2016
   Title: Canard and mixed mode oscillations in a glow discharge plasma in the presence of inhomogeneous magnetic field.

4. 9^{th} Chaotic Modeling and Simulation International Conference (CHAOS-2016)
   University of London, London, UK. May, 2016
   Title: Study of period doubling and homoclinic bifurcation in glow discharge plasma in the presence of a bar magnet.

5. 30^{th} National symposium on plasma science & technology
   Saha Institute of Nuclear Physics, Kolkata, India. December 2015
   Title: Energization of charged particle in time-dependent chaotic double curl beltrami magnetic fields.

6. 4^{th} PSSI-PLASMA scholars colloquium (PSSI-PSC-2015)
   Jadavpur University, Kolkata, India. August 2015
   Title: Transition from chaotic bursting to chaotic spiking in a glow discharge plasma

7. 9^{th} Conference on Nonlinear Systems and Dynamics (CNSD)
   IISER Mohali, Panjab, India. March 2015
   Title: Intrinsic noise induced coherence resonance in a glow discharge plasma.

8. 3^{rd} PSSI-PLASMA scholars colloquium (PSSI-PSC-2014)
   VIT Chennai, Chennai, India. July 2014
   Title: Transition from chaotic bursting to chaotic spiking in a glow discharge plasma

9. 3^{rd} International Symposium on Complex Dynamical Systems and Applications (CDSA- 2014)
   ISI Kolkata, West Bengal, India. March 2014
   Title: A fourth order nonlinear ODE(Spasm) for electrostatic ion cyclotron oscillations in the presence of oblique magnetic field.

10. Seminar on Nonlinear Aspects of Plasmas and Fluids
    Jadavpur University, Kolkata, India. January 2014
    Title: Detection of coherent structure in a chaotic time series generated through jerk equation.

11. 28^{th} National Symposium on Plasma Science & Technology December 2013
    KIIT, Bhubaneswar, Odisha, India.
    Title: Detection of coherent structures in the chaotic time series of a dc glow discharge plasma using empirical mode decomposition.

12. 2^{nd} PSSI-PLASMA scholars colloquium & National workshop on plasma devise technology
    CEERI PILANI, Rajshtan, India. July 2013
    Title: Nonlinear dynamical modelling of electrostatic ion cyclotron oscillations.

Schools:

- Hands on School on Nonlinear Dynamics
  Institute for Plasma Research, Gandhinagar, India. February 2015
- DST-SERC School on Nonlinear Dynamics
  Department of Physics, Panjab University, Chandigarh, India. Jan 2014

Workshops:

- Workshop on Nonlinear Differential Equations: Dynamics of Complex Systems
  University of Calcutta, Kolkata, India. September 2013
- Indo-US Workshop on Time Series Analysis (WTSA 2015)
  IISER Pune, Pune, India. May 2015

Overall Research Highlights

- No. of citations: 114
- h index: 6
- i index: 5

Note: Data is taken from https://scholar.google.co.in/citations?user=w8qse8MAAAAJ&hl=en

Membership of Scientific Bodies

- Member of Plasma Science Society of India.

Referees

Prof. M. S. Janaki

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