Aman Kumar Singh

Curriculum Vitae

Department of Physics
Maharshi Vishwamitra College
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Education

2013–2020 **PhD in Physics**, Institute of Science, Banaras Hindu University, India.
Thesis title: Studies on Synchronization and Chaotic Dynamics of Coupled Nonlinear Oscillators
Date of registration: November 22, 2013,
Date of submission: June 19, 2019,
Date of viva-voce: January 23, 2020,
Date of award: February 11, 2020.

2011–2013 **Master of Science in Physics**, Banaras Hindu University, India.
Master dissertation title: Scattering due to non-Hermitian Potentials

2008–2011 **Bachelor of Science (Hons.) in Physics**, Banaras Hindu University, India.

Teaching & Research Experience

23/12/2024–present **Assistant Professor of Physics**, Maharshi Vishwamitra College-Buxar BR, India.

22/01/2024–23/09/2024 **Postdoctoral Research Associate**, University of Dayton, USA.

19/10/2022–22/12/2023 **Assistant Professor**, Department of Physics, VIT-Vellore, India.

27/01/2020–25/01/2022 **Institute Postdoctoral Fellow**, Indian Institute of Technology Kanpur, India.

Fellowships & Awards

2020 ***Institute Postdoctoral Fellowship*** of Indian Institute of Technology Kanpur (IIT-K), India.

2013 Awarded ***Junior Research Fellowship*** for qualifying *National Eligibility Test*-2012 conducted jointly by CSIR-UGC, New Delhi, India.

2011 Awarded Book Prize and Certificate of Merit by ***Indian Association of Physics Teachers (IAPT)*** for securing place among top 1% candidates in *National Graduate Physics Exam.*

Research interests

Nonlinear dynamics, Pattern formation, Reaction-diffusion systems, Stochastic dynamics, Epidemic modeling.

Teaching interests

Classical Mechanics, Statistical Physics, Mathematical Physics

Publication

In journals

2024 **Aman Kumar Singh**, S. Ramakrishnan, and Manish Kumar. Instabilities and self–organization in spatiotemporal epidemic dynamics driven by nonlinearity and noise. *Physical Biology*, volume 21, page 046001, 2024.

2024 **Aman Kumar Singh**, C. Buschmeyer, S. Ramakrishnan, and M. Kumar. Instabilities and pattern formation in epidemic spread induced by nonlinear saturation effects and Ornstein-Uhlenbeck noise. *ASME Letters in Dynamic Systems and Control*, 2024.

2024 **Aman Kumar Singh**. Stochastic resonance in coupled harmonic oscillators: Mean field and coupling induced dissipation. *Discontinuity, Nonlinearity, and Complexity*, volume 13, pages 203–216, 2024.

2024 S. Ramakrishnan and **Aman Kumar Singh**. Stochastic dynamics of a nonlinear vibration energy harvester subjected to a combined parametric and external random excitation: The distinct cases of Itô and Stratonovich stochastic integration. *International Journal of Non-Linear Mechanics*, volume 162, page 104700, 2024.

2023 **Aman Kumar Singh** and S. Ramakrishnan. On the nonlinear stochastic dynamics of an atomic force microscope cantilever. *ASME Letters in Dynamic Systems and Control*, volume 3, page 031006, 2023.

2023 **Aman Kumar Singh**. A comparative study of stochastic resonance phenomenon under diffusive and direct coupling. *Fluctuation and Noise Letters*, volume 22, page 2350012, 2023.

2022 **Aman Kumar Singh**, J. Meyer, and S. Ramakrishnan. On the emergence of traffic jams in a stochastic traffic flow driven by additive and multiplicative white gaussian noise processes. *Journal of Statistical Mechanics: Theory and Experiment*, volume 12, page 123401, 2022.

2020 S. Mishra, **Aman Kumar Singh***, and R. D. S. Yadava. Effects of nonlinear capacitance in feedback LC-tank on chaotic Colpitts oscillator. *Physica Scripta*, volume 95, pages 1–10, 2020.

2020 B. P. Mandal, B. Maurya, and **Aman Kumar Singh**. QES solutions of a two-dimensional system with quadratic non-linearities. *European Physical Journal Plus*, volume 135, pages 1–10, 2020.

2019 **Aman Kumar Singh** and R. D. S. Yadava. Transient motion and chaotic dynamics in a pair of van der pol oscillators. *European Physical Journal Plus*, volume 134, pages 1–10, 2019.

2019 **Aman Kumar Singh** and R. D. S. Yadava. Synchronization and amplitude death in a pair of van der pol oscillators under conjugate coupling. *Physica Scripta*, volume 94, pages 1–10, 2019.

2019 **Aman Kumar Singh** and R. D. S. Yadava. Quadrature synchronization of a pair of van der pol oscillators coupled by NEMS varactor: a theoretical analysis. *Journal of Applied Nonlinear Dynamics*, volume 8, pages 475–491, 2019.

In conference proceedings

2024 Aman Kumar Singh, Noelle Boltz, Manish Kumar, and Subramanian Ramakrishnan. Turing-type instabilities and pattern formation induced by saturation effects and randomness in nonlinear, diffusive epidemic spread. In *2024 American Control Conference (ACC)*, pages 4711–4716, 2024.

2023 **Aman Kumar Singh**, Grace Miller, Manish Kumar, and Subramanian Ramakrishnan. Dynamic instabilities and pattern formation in diffusive epidemic spread. In *IFAC-PapersOnLine*, volume 56, pages 463–468, 2023.

2019 S. Mishra, **Aman Kumar Singh**, and R. D. S. Yadava. Enhancing spectral range and power of chaos in colpitts oscillator by diode-varactor based capacitive nonlinearity in lc-tank. In *IEEE Xplore*, pages 132–137, 2019.

2018 **Aman Kumar Singh** and R. D. S. Yadava. Stability of in-phase and out-of-phase synchronization modes in van der pol-duffing oscillators coupled by fractional order derivative. In *IEEE Xplore*, pages 1–6, 2018.

2018 **Aman Kumar Singh** and R. D. S. Yadava. Quadrature synchronization of two van der pol oscillators coupled by fractional-order derivatives. In *AISC Series: Springer*, volume 714, pages 585–594, 2018.

2018 **Aman Kumar Singh** and R. D. S. Yadava. Amplitude and phase fluctuations of van der pol oscillator under external random forcing. In *AIP Conference Proceedings*, volume 1953, 2018.

2018 **Aman Kumar Singh**, V. Verma, and R. D. S. Yadava. Stochastic resonance in bagley-torvik equation. In *Lecture Notes in Electrical Engineering: Springer*, volume 475, pages 498–505, 2018.

International/National Conferences: Attended/Abstract Published

1. Presented a paper entitled, “Stochastic Resonance in Bagley-Torvik Equation”, in the First International Conference on Advanced Computational and Communication Paradigms (ICACCP-2017) organized by Sikkim Manipal Institute of Technology, Sikkim, India during Sep 8–10, 2017
2. Presented a paper entitled, “Quadrature Synchronization of Two Van der Pol Oscillators Coupled by Fractional-Order Derivatives”, in the 2nd International Conference on Advanced Computing and Intelligent Engineering (ICACIE-2017) organized by Central University of Rajasthan, Ajmer, India during November 23-25, 2017.

3. Presented a paper entitled, "Stability of in-phase and out-of-phase synchronization modes in Van der Pol-Duffing oscillators coupled by fractional order derivative" in ICIIECS 2017 organized by Karpagam College of Engineering, Coimbatore, Tamilnadu, India during March 17-18, 2017.

4. Presented a poster on topic, "Amplitude and Phase Fluctuations of Van der Pol Oscillators Under External Random Forcing" in the 2nd International Conference on Condensed Matter & Applied Physics (ICC-2017) organized by Govt. Engineering College, Bikaner, Rajasthan, India during November 24–25, 2017.

5. Presented a paper entitled, "Enhancing Spectral Range and Power of Chaos in Colpitts Oscillator by Diode-Varactor Based Capacitive Nonlinearity in LC-Tank", in International Conference on Engineering and Technology (ICET- 2016) organized by Karpagam College of Engineering, Coimbatore, Tamilnadu, India during October 18–19, 2016.

6. Participated in National Conference on Current Trends in Physics-II organized by Department of Physics, Banaras Hindu University, Varanasi-221005, India during held during September 23–24, 2017 .

7. Participated in Centenary Year One Day Conference on Recent Trends in Physics organized by at Department of Physics, Banaras Hindu University, Varanasi-221005, India on February 20, 2016.

8. Participated in the 4th International Conference on Complex Dynamical Systems and Applications (CDSA-2016) organized by NIT, Durgapur, India during February, 15–17 2016.

9. Participated in the 8th One Day Conference on Recent Trends in Research organized by Department of Physics, Banaras Hindu University, Varanasi-221005, India on Feb. 07, 2015 .

Short-term course /workshop/seminar/FDP

1. Participated in Faculty Development Program on CO Attainment Calculation organized by School of Advanced Sciences, **Vellore Institute of Technology**, Vellore, Tamil Nadu-632014, India on March 22, 2023.

2. Participated in Networks and Dynamical Systems International Workshop organized by Complex Systems and Dynamics group **IIT Madras**, India during August 25–28, 2021.

3. Participated in one week online Faculty Development Program on Emerging Trends in Applied Physics organized by Department of Physics, Faculty of Science, **SGT University**, Delhi-NCR, India during July 05–09, 2021.

4. Participated in SERB School on Nonlinear Dynamics organized by Department of Mathematics, **Savitribai Phule Pune University**, Pune, India during January 02-29, 2018.

Reviewer/Editorial experience

Reviewers of reputed journals, e.g., Journal of Physics D: Applied Physics (IOP), Chaos Solitons and Fractals (Elsevier), European Physical Journal Plus, Physica Scripta (IOP), Journal of Sound and Vibrations (Elsevier), Advances in Civil Engineering (Wiley) and IEEE Access.

Computer skills

Programming Languages: Python, MATLAB

Personal details

DOB: July 15, 1991

Nationality: Indian