Dr. C. Selvaraju

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Pudukkottai, Tamil Nadu, India

Professional Summary

Physicist with over seven years of research experience in nonlinear dynamics, quantum chaos, and nanomaterials. Experienced in theoretical modelling, numerical simulations, and experimental nanomaterials research. Author of multiple peer-reviewed publications in international journals. Interested in interdisciplinary research combining nonlinear physics, quantum systems, and advanced materials.

Research Interests

- Nonlinear Dynamics and Chaos
- Quantum Chaos and Quantum Systems in External Fields
- Bose–Einstein Condensates and Optical Lattices
- Nanomaterials and Functional Oxides
- Optical and Spectroscopic Properties of Nanostructures
- Computational Physics and Numerical Simulation

Education

Ph.D. in Physics (Nonlinear Dynamics)
Bharathidasan University, Tamil Nadu, India

M.Sc. Physics
Bharathidasan University, Tamil Nadu, India

B.Ed. Physical Science
Tamil Nadu Teachers Education University

B.Sc. Physics
Bharathidasan University, Tamil Nadu, India

Research Experience

Doctoral Researcher
Bharathidasan University

- Investigated nonlinear dynamics and chaos in quantum systems under external magnetic fields.
- Studied chaos–order transitions in hydrogen molecular ion systems using numerical simulations.

- Conducted computational modelling using FORTRAN, Python, and Mathematica.
- Collaborated on experimental research involving rare-earth doped ZnO nanomaterials.
- Synthesized and characterized nanomaterials for optical and antibacterial applications.

Teaching Experience

Guest Lecturer
Department of Physics, V.S.S Government Arts College, Pulankurichi
2019 – Present

- Teaching undergraduate physics courses including Mechanics, Electrodynamics, Quantum Mechanics, and Solid State Physics.
- Guided student research projects in spectroscopy and nanomaterials.
- Developed course materials and participated in academic committees.

Publications

1. Karthick, R., **Selvaraju, C.** (2026). Facile synthesis of Co-doped ZnS nanoparticles with optimized electrochemical behavior for energy storage applications. *Journal of Materials Science: Materials in Electronics*, 37(4), 320.
2. **Selvaraju, C.**, Sabari, S., Lekeufack, O.T., Kenmogne, F., Athavan, N. (2025). Chaotic dynamics of Bose–Einstein condensates with tunable scattering length trapped in a tilted optical lattice potential. *The European Physical Journal Plus*, 140, 545.
3. Athavan, N., **Selvaraju, C.** (2025). Quantum mechanical manifestation of order–chaos–order–chaos switch-over in hydrogen molecular ion perturbed with varying magnetic field. *Pramana – Journal of Physics*, 99(2), 62.
4. Karthick, R., Sakthivel, P., **Selvaraju, C.**, Thirumurugan, A. (2023). Effect of Mg on structural, photoluminescence and antibacterial behaviours of ZnO nanoparticles. *MRS Advances*, 8(19), 1090–1096.
5. Athavan, N., **Selvaraju, C.** (2021). Chaos–order–chaos transition in hydrogen molecular ion placed in external magnetic field. *The European Physical Journal D*, 75, 206.
6. Karthick, R., Sakthivel, P., **Selvaraju, C.**, Paulraj, M.S. (2021). Tuning of photoluminescence and antibacterial properties of ZnO nanoparticles through Sr doping for biomedical applications. *Journal of Nanomaterials*, 2021, Article ID 8352204.
7. **Selvaraju, C.**, Karthick, R., Veerasubam, R. (2019). The modification of structural, optical and antibacterial activity properties of rare-earth gadolinium-doped ZnO nanoparticles prepared by co-precipitation method. *Journal of Inorganic and Organometallic Polymers and Materials*, 29(3), 776–782.
8. **Selvaraju, C.**, Athavan, N., Karthick, R. (2018). Investigation on structural, morphology and photoluminescence properties of lanthanum doped zinc oxide nanostructure for optical application by co-precipitation method. *Journal of Materials Science: Materials in Electronics*, 29(13), 11553–11558.

Books

1. **Selvaraju, C.**, Karthick, R., Jayaprakash, K. *Principles of Computational Modeling for the Analysis of Nanostructured Materials*. LAP Lambert Academic Publishing (OmniScriptum S.R.L.), Saarbrücken, Germany. ISBN: 978-620-8-17216-9.
2. **Selvaraju, C.** *Rare Earth Metals Doped ZnO Nanoparticles Prepared by Co-precipitation Method*. LAP Lambert Academic Publishing (OmniScriptum S.R.L.), Saarbrücken, Germany. ISBN: 978-620-0-10263-8.

Patent

- **Selvaraju, C.** et al. (2022). *A Nanomaterial Composition Having Magnetic Properties*.

  Indian Patent Application No: 202241006308. Publication Number: 06/2022. Publication Date: 11 February 2022.

  Office of the Controller General of Patents, Designs & Trade Marks, Government of India.

Research Skills

- Numerical simulation of nonlinear dynamical systems
- Chaos analysis and phase space dynamics
- Computational modelling of quantum systems
- Nanomaterials synthesis using co-precipitation techniques
- Optical and structural characterization of nanomaterials
- Scientific manuscript preparation and publication

Technical Skills

- FORTRAN
- Python
- C / C++
- Mathematica
- Gnuplot
- OriginLab
- Linux / Ubuntu
- MS Office

Awards and Certifications

- TNSET Qualified (Physics), 2017
- Best Paper Presenter, ICRAM Conference

References

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