

CONTACT
INFORMATION

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EMPLOYMENT

Guest Lecturer, Department of Physics, *MAMO College*,
 Manassery (July 2025 - Present)

Postdoctoral Fellow in theoretical physics, *Raman Research Institute*,
 Mentor: Prof. Dibyendu Roy (May 2022 -May 2025).

Research Associate, *Chennai Mathematical Institute*,
 Mentor: Prof. Govind S Krishnaswami (October 2021 - March 2022).

EDUCATION

- Ph.D August 2016-September 2021
Chennai Mathematical Institute, Ph.D. in Physics,
 Thesis title: **Integrability and dynamics of the Rajeev-Ranken model**,
 Advisor: Prof. Govind S Krishnaswami.
- Masters August 2014-July 2016
Chennai Mathematical Institute, M.Sc. in Physics,
 Thesis Title: **Integrability and inverse scattering transform for the KdV equation**, Advisor: Prof. Govind S Krishnaswami.
- Masters July 2012-May 2014
University of Hyderabad, M.Sc. in Physics,
 Thesis Title: **Study of Neutrino mass models**,
 Advisor: Prof. Rukmani Mohanta.
- Undergraduate August 2009-July 2012
St. Joseph's College, Devagiri, B.Sc. Physics,
 Project Title: **Spectroscopic studies of the twin quasar 0957+561 - The first gravitational lens (Group project)**, Advisor: Prof. S I Issac.

PUBLICATIONS

- *Heat transport through an open coupled scalar field theory hosting stability-to-instability transition*, T R Vishnu and Dibyendu Roy, *J. Stat. Phys.* **191**, 123 (2024) [arXiv:2402.04986](https://arxiv.org/abs/2402.04986) [cond-mat.stat-mech].
- *Screwon spectral statistics and dispersion relation in the quantum Rajeev-Ranken model*, Govind S Krishnaswami and T R Vishnu, *Physica D: Nonlinear Phenomena* **463**,134170 (2024), [arXiv:2312.13122](https://arxiv.org/abs/2312.13122) [nlin.SI].
- *Spectral solutions for the Schrödinger equation with a regular singularity*, Pushkar Mohile, Ayaz Ahmed, T R Vishnu, and Pichai Ramadevi, *SciPost Phys. Core* **7**, 041 (2024), [arXiv:2309.00026](https://arxiv.org/abs/2309.00026) [quant-ph].
- *Quantum Rajeev-Ranken model as an anharmonic oscillator*, Govind S Krishnaswami and T R Vishnu, *J. Math. Phys.* **63**, 032101 (2022), [arXiv:2111.03858](https://arxiv.org/abs/2111.03858) [math-ph].
- *The idea of a Lax pair-Part II: Continuum wave equations*, Govind S Krishnaswami and T R Vishnu, *Resonance* **26**, 257 (2021).
- *The idea of a Lax pair-Part I: Conserved quantities for a dynamical system*, Govind S Krishnaswami and T R Vishnu, *Resonance* **25**, 1705 (2020).
- *An introduction to Lax pairs and the zero curvature representation*, Govind S Krishnaswami and T R Vishnu, [arXiv:2004.05791](https://arxiv.org/abs/2004.05791)[nlin.SI].
- *Invariant tori, action-angle variables and phase space structure of the Rajeev-Ranken model*, Govind S Krishnaswami and T R Vishnu, *J. Math. Phys.* **60**, 082902 (2019), [arXiv:1906.03141](https://arxiv.org/abs/1906.03141)[nlin.SI].
- *On the Hamiltonian formulation, integrability and algebraic structures of the Rajeev-Ranken model*, Govind S Krishnaswami and T R Vishnu, *J. Phys. Com-*

mun. **3**, 025005 (2019), arXiv:1804.02859 [hep-th].

RESEARCH
INTERESTS

Theoretical and Mathematical Physics: Quantum field theory, Integrability in classical and quantum systems and field theories, Dynamical systems, Heat transport, Open quantum systems, Random matrix theory, Nonlinear dynamics & Chaos.

RESEARCH
EXPERIENCE

- Two dimensional field theory, Partial differential equations, Poisson-Lie algebras, Inverse scattering, KdV equation, Lax pairs, r -matrices, Hamiltonian formulation, Integrability, Invariant tori and action-angle variables, Exact-WKB method, Energy-level statistics, Quantum Langevin equations, Non-equilibrium Green's functions, OTOC.

CONFERENCES
AND SCHOOLS

- *9th Indian Statistical Physics Community Meeting*, 3-5 April, 2024, International Center for Theoretical Sciences, Bangalore.
- *Stability of quantum matter in and out of equilibrium at various scales*, 15-26 January, 2024, International Center for Theoretical Sciences, Bangalore.
- *8th Indian Statistical Physics Community Meeting*, 1-3 February, 2023, International Center for Theoretical Sciences, Bangalore.
- *Conference on Nonlinear Systems and Dynamics* (Online), 17-22 December, 2021, SASTRA Deemed University, Thanjavur.
- *Bangalore School on Statistical Physics - XII* (Online), 28 June-9 July, 2021, International Center for Theoretical Sciences, Bangalore.
- *Lecture series on Basics of nonlinear integrable systems and their applications* (Online), 7-17 April, 2021, SASTRA Deemed University, Thanjavur.
- *XXXIII SERB Main school-Theoretical High Energy Physics*, 7-26 December, 2019, S.G.T.B. Khalsa College, University of Delhi.
- *Young Researchers Integrability School and Workshop: A modern primer for 2D CFT*, 10-16 February, 2019, Erwin Schrödinger international Institute of Mathematics and Physics, Vienna.
- *Conference on Nonlinear Systems and Dynamics*, 11-14 October, 2018, Jawaharlal Nehru University - New Delhi.
- *Integrable systems in Mathematics, Condensed Matter and Statistical Physics*, 16 July-10 August, 2018, International Center for Theoretical Sciences, Bangalore.

TALKS AND
POSTERS

- Talk, *Heat transport through an open coupled scalar field theory hosting stability-to-instability transition*, 9th Indian Statistical Physics Community Meeting, April 05, 2024, International Center for Theoretical Sciences, Bangalore.
- Talk, *Dynamical stability of a coupled scalar field theory: Different perspectives*, 8th Indian Statistical Physics Community Meeting, February 03, 2023, International Center for Theoretical Sciences, Bangalore.
- Talk, *Dynamics and integrability of the Rajeev-Ranken model*, Chennai Strings Meeting, December 15, 2020, Institute of Mathematical Sciences (Webinar).
- Talk, *Integrability of a mechanical reduction of a dual to the principal chiral model*, National Symposium on Theoretical High Energy Physics, December 20, 2019, SGTB Khalsa College, University of Delhi.
- CMI Seminar, *On the Hamiltonian formulation and integrability of the Rajeev-Ranken model*, Chennai Mathematical Institute, March 20, 2019, Chennai.
- Poster presentation, *Hamiltonian dynamics and integrability of the Rajeev-Ranken model*, Conference on Nonlinear Systems and Dynamics, 11-14 October, 2018, Jawaharlal Nehru University, New Delhi.
- Poster presentation, *Hamiltonian dynamics and integrability of the Rajeev-Ranken*

model, Integrable systems in Mathematics, Condensed matter and Statistical Physics, 16 July-10 August, 2018, International Center for Theoretical Sciences, Bangalore.

- CMI Seminar, *Some features of a 1+1 dimensional field theory dual to the Principal Chiral model*, Chennai Mathematical Institute, October 3, 2017, Chennai.

TEACHING

- Teaching assistant for the course on Classical Mechanics, Course Instructor: Govind S Krishnaswami, Sep-Dec 2021, Chennai Mathematical Institute.
- Teaching assistant for the course on Thermal Physics, Course Instructor: Govind S Krishnaswami, Aug-Nov 2019, Chennai Mathematical Institute.
- Teaching assistant for the Workshop of the Academy of Physics Teachers, Kerala, Topic: Scattering in Quantum Mechanics, Course Instructor: Govind S Krishnaswami, 23-24 June, 2018, Christ College, Irinjalakuda.
- Teaching assistant for the course on Continuum Mechanics, Course Instructor: Govind S Krishnaswami, Jan-Apr 2018, Chennai Mathematical Institute.

INTERNSHIPS

Institute of Physics

May-June 2013

Students' summer visiting program (SSVP-2013)- A reading project on 'Neutrino oscillations' under the guidance of Prof. Pankaj Agarwal at IOP Bhubaneswar.

ACHIEVEMENTS

- 2011 - National Cadet Corps - C certificate holder
- 2012 - Was ranked among the top 15 in all Kerala Physics Talent Search, conducted by Academy of Physics Teachers, (APT) Kerala.
- 2014 - Qualified Joint Entrance Screening Test (JEST).

REFERENCES

Prof. Govind S. Krishnaswami
Professor, Chennai Mathematical Institute
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Prof. Dibyendu Roy
Professor, Raman Research Institute
droy@rri.res.in

Prof. P. Ramadevi
Professor, Indian Institute of Technology Bombay
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