

CONTACT INFORMATION	Raman Research Institute C. V. Raman Avenue Sadashivanagar Pin Code: 560 080, Bengaluru, India.	<i>Phone:</i> (+91)-9567320446 <i>E-mail:</i> <a href="mailto:vishnu@rrimail.rri.res.in">vishnu@rrimail.rri.res.in</a> <a href="mailto:vishnutr1992@gmail.com">vishnutr1992@gmail.com</a> <i>Website:</i> <a href="http://vishnu-tr.github.io">vishnu-tr.github.io</a>
EMPLOYMENT	Postdoctoral Fellow in theoretical physics, <i>Raman Research Institute</i> , Mentor: <i>Prof. Dibyendu Roy</i> (May 2022 -present).  Research Associate, <i>Chennai Mathematical Institute</i> , Mentor: <i>Prof. Govind S Krishnaswami</i> (October 2021 - March 2022).	
EDUCATION	Ph.D <span style="float:right">August 2016-September 2021</span> <i>Chennai Mathematical Institute</i> , Ph.D. in Physics, Thesis title: <b>Integrability and dynamics of the Rajeev-Ranken model</b> , Advisor: <i>Prof. Govind S Krishnaswami</i> . Masters <span style="float:right">August 2014-July 2016</span> <i>Chennai Mathematical Institute</i> , M.Sc. in Physics, Thesis Title: <b>Integrability and inverse scattering transform for the KdV equation</b> , Advisor: <i>Prof. Govind S Krishnaswami</i> . Masters <span style="float:right">July 2012-May 2014</span> <i>University of Hyderabad</i> , M.Sc. in Physics, Thesis Title: <b>Study of Neutrino mass models</b> , Advisor: <i>Prof. Rukmani Mohanta</i> . Undergraduate <span style="float:right">August 2009-July 2012</span> <i>St. Joseph's College, Devagiri</i> , B.Sc. Physics, Project Title: <b>Spectroscopic studies of the twin quasar 0957+561 - The first gravitational lens (Group project)</b> , Advisor: <i>Prof. S I Issac</i> .	
PUBLICATIONS	<ul style="list-style-type: none"> <li>• <i>Heat transport through an open coupled scalar field theory hosting stability-to-instability transition</i>, T R Vishnu and Dibyendu Roy, <i>J. Stat. Phys.</i> <b>191</b>, 123 (2024) <a href="https://arxiv.org/abs/2402.04986">arXiv:2402.04986</a> [cond-mat.stat-mech].</li> <li>• <i>Screwon spectral statistics and dispersion relation in the quantum Rajeev-Ranken model</i>, Govind S Krishnaswami and T R Vishnu, <i>Physica D: Nonlinear Phenomena</i> <b>463</b>, 134170 (2024), <a href="https://arxiv.org/abs/2312.13122">arXiv:2312.13122</a> [nlin.SI].</li> <li>• <i>Spectral solutions for the Schrödinger equation with a regular singularity</i>, Pushkar Mohile, Ayaz Ahmed, T R Vishnu, and Pichai Ramadevi, <i>SciPost Phys. Core</i> <b>7</b>, 041 (2024), <a href="https://arxiv.org/abs/2309.00026">arXiv:2309.00026</a> [quant-ph].</li> <li>• <i>Quantum Rajeev-Ranken model as an anharmonic oscillator</i>, Govind S Krishnaswami and T R Vishnu, <i>J. Math. Phys.</i> <b>63</b>, 032101 (2022), <a href="https://arxiv.org/abs/2111.03858">arXiv:2111.03858</a> [math-ph].</li> <li>• <i>The idea of a Lax pair-Part II: Continuum wave equations</i>, Govind S Krishnaswami and T R Vishnu, <i>Resonance</i> <b>26</b>, 257 (2021).</li> <li>• <i>The idea of a Lax pair-Part I: Conserved quantities for a dynamical system</i>, Govind S Krishnaswami and T R Vishnu, <i>Resonance</i> <b>25</b>, 1705 (2020).</li> <li>• <i>An introduction to Lax pairs and the zero curvature representation</i>, Govind S Krishnaswami and T R Vishnu, <a href="https://arxiv.org/abs/2004.05791">arXiv:2004.05791</a> [nlin.SI].</li> <li>• <i>Invariant tori, action-angle variables and phase space structure of the Rajeev-Ranken model</i>, Govind S Krishnaswami and T R Vishnu, <i>J. Math. Phys.</i> <b>60</b>, 082902 (2019), <a href="https://arxiv.org/abs/1906.03141">arXiv:1906.03141</a> [nlin.SI].</li> <li>• <i>On the Hamiltonian formulation, integrability and algebraic structures of the Rajeev-Ranken model</i>, Govind S Krishnaswami and T R Vishnu, <i>J. Phys. Commun.</i> <b>3</b>, 025005 (2019), <a href="https://arxiv.org/abs/1804.02859">arXiv:1804.02859</a> [hep-th].</li> </ul>	

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	<ul style="list-style-type: none"> <li>• Teaching assistant for the course on Classical Mechanics, Course Instructor: Govind S Krishnaswami, Sep-Dec 2021, Chennai Mathematical Institute.</li> <li>• Teaching assistant for the course on Thermal Physics, Course Instructor: Govind S Krishnaswami, Aug-Nov 2019, Chennai Mathematical Institute.</li> <li>• 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.</li> <li>• Teaching assistant for the course on Continuum Mechanics, Course Instructor: Govind S Krishnaswami, Jan-Apr 2018, Chennai Mathematical Institute.</li> </ul>
INTERNSHIPS	<p><i>Institute of Physics</i> <span style="float: right;"><i>May-June 2013</i></span>  Students' summer visiting program (SSVP-2013)- A reading project on 'Neutrino oscillations' under the guidance of Prof. Pankaj Agarwal at IOP Bhubaneswar.</p>
ACHIEVEMENTS	<ul style="list-style-type: none"> <li>• 2012 - Was ranked among the top 25 in all Kerala Physics Talent Search, conducted by Academy of Physics Teachers, (APT) Kerala.</li> <li>• 2014 - Qualified Joint Entrance Screening Test (JEST).</li> </ul>
REFERENCES	<p>Prof. Dibyendu Roy  Professor, Raman Research Institute  <i>droy@rri.res.in</i></p> <p>Prof. Govind S. Krishnaswami  Professor, Chennai Mathematical Institute  <i>govind@cmi.ac.in</i></p>