

Roshan Raj

Curriculum Vitae

Upto Oct., 2023

Personal Details

Name: Roshan Raj
Nationality: Indian
Address: Patna, Bihar, India-800010
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Research Interests

I'm interested in the theoretical realms of Constructive Quantum Field Theories and Quantum Foundations. Fundamentally passionate about getting the essence of Mass, Time, Charge, and Symmetries in the Universe and aspiring to engage in Unification Theories and interpretative endeavours over time.

Educational Details

Five Years Integrated M.Sc. (Physics), *Sardar Vallabhbhai* National Institute of Technology (SV-NIT), Surat, India. CGPA: 9.35/10 (current)
Title of Dissertation: *On the novel approach to relativistic Quantum Mechanics**.
2019-24 Supervisor: Dr. Vikash K. Ojha.
- A connection between kinetic energy and momentum of a relativistic system is derived and used in quantum mechanical problems to demonstrate that it can formulate a *consistent* relativistic quantum mechanical Hamiltonian.
2016-18 Loyola High School, CBSE, Patna, Bihar, 77.2% , Senior Secondary High Schooling [Physics, Chemistry, Mathematics, Informatics Practices, English]
2010-16 St. Paul's High School, ICSE, Patna, Bihar, 91.6%, High Schooling [Science, Mathematics, Computer App., Social Sci., Hindi, English]

Achievements

09/16 NTS Scholarship of merit, Government of India, New Delhi.
04/23 Qualified Graduate Aptitude Test in Engineering (GATE)-23, National Rank: 3409
02/20 Winner (Physics), InQuest 4.0, SCOSH [Student Chapter], SVNIT
03/20 Runner Up (Pratyaksha), Physics Club, SVNIT

Skills

Programme: C, Python, MATLAB, Octave
Softwares: L^AT_EX, MS Excel, MS Office, Mathematica
Web Design: Basics of HTML5, CSS3, and use of GitHub.
Languages: English (Working), Hindi(Native)

List of completed Research Projects

[See a full detailed list]

[8] Date of completion: 05 Oct 2023

Title: *On the novel approach to Relativistic Quantum Mechanics-I*

Guide: Dr Vikash K Ojha, SVNIT-Surat

Type: Master's Dissertation-A

URL: **Click to See**

[7] Date of completion: 05 Jul 2023

Date of pre-print:-

Title: *Obtaining the Klein-Gordon wave equation without using the quantum operators*

Type: Article

DOI:-

[6] Date of completion: 19 Nov 2022

Title: *New light on the concepts of Observable and indeterminacy in the quantum realm*

Type: UG Project III, [Jul-Dec, 2022]

URL: **Click to See**

[5] Date of completion: 19 Nov 2022

Date of pre-print/publication: 08 Oct 2023: OSF Preprints

Title: *An open-ended story on quantization*

Type: Article

DOI: **10.31219/osf.io/92bvp**

[4] Date of completion: 17 Sep 2022

Date of pre-print/publication: 10 Oct 2023: OSF Preprints

Title: *Reviewing Observables in Classical and Quantum Mechanics*

Type: Article

DOI: **10.31219/osf.io/p2ufx**

[3] Date of completion: 17 Jul 2022

Title: *The pictures of quantum dynamics* [Hindi]

Type: Internship [May-Jul, 2022]

URL: **Request Book Chapter**

[2] Date of completion: 09 May 2022

Date of pre-print: 21 Sep 2022: arXiv Preprints

Title: *On the investigation of two non-neutral static bodies*

Type: UG Project II, [Jan-May, 2022]

DOI: **10.48550/arXiv.2209.10641**

[1] Date of completion: 08 Dec 2021

Date of pre-print: 29 Sep 2023: OSF Preprints

Title: *Dynamics of Two Objects Considering the Minimum Total Potential Energy Principle*

Type: UG Project I, [Jul-Dec, 2021]

DOI: **10.31219/osf.io/ukx9t**

Talks & Books

02/07/23 MaNoVighn: Short Poetry Collections, Kindle, ASIN: B0C9Y7X1PG

01/09/21 KālSanGharsha: Short Poetry Collections, Kindle, ASIN: B09FC1XRPK

13/11/21 *Unification in Mathematics*, IntERAct Seminar series, AMHD, SVNIT-Surat

Workshops & Webinars

07/21	<i>Quantum Fields, Geometry & Representation Theory</i> , ICTS-TIFR, Bangalore.
12/20	National workshop on <i>Data analysis using MS Excel</i> , BBD NITM, Lucknow.
08/20	National workshop on <i>MATLAB Tools And Applications</i> , BBD NITM, Lucknow.

Selected Courses

Ph.D. <i>self-preparation</i> /Undone:	Relativistic Quantum Mechanics, Classical Field Theory, Canonical Quantization, Interacting Quantum fields, Path Integrals*, General relativity I & II, SUSY & Supergravity, Cosmology, String theory I & II , Constructive QFT*, Basics of Topology and Differential Manifold, Lie Groups & Lie Algebra*, Geometric Algebra*, Algebraic Geometry, Algebraic Topology, Groups & Representations, Differential Geometry, Geometric group theory.
University (Physics):	Quantum Field Theory I, Many-Body Physics and Relativistic Quantum Mechanics, Particle Physics, Nuclear Physics, Special Relativity, Quantum Mechanics I & II, Computational Physics(Python, Monte-Carlo), Computational Methods(MATLAB/Octave), Atomic and Molecular Physics, Electrodynamics, Statistical Mechanics, Astrophysics, Density Functional Theory, and Classical Mechanics.
Certifications:	A Course in Math History[Aug-Sep'21], Classical Electromagnetism[Aug-Dec'20], Learning Physics through Simple Experiments[Apr-Jun'20], The advanced course on Special Theory of Relativity[Jan-May'20], The basics of Quantum Mechanics[Aug-Nov'19] and The basics of Special Theory of Relativity[Jan'18-Mar'19]

Other

I am enthusiastic and will listen to Mathematical beauty, Ancient history and philosophy, and social justice. My hobbies are Hindi Poetry, Graphic Designing, and writing articles. I took responsibility as Co-convenor/Co-head of the SCOSH-student chapter SVNIT for a year and was its member as a graphic designer since 2020. Next year, I served as the Joint Academic Affairs Secretary appointed by the Student Academic Affairs Council SVNIT, Surat, and then later as Student Coordinator of the QUANTA Seminar series, Physics Department, SVNIT in 2022. Additionally, I am venturing into various flavours of Geometric Algebra. Open to learning, failure and exploration.