



# Sardar Dilbag Singh Khalsa

Aspiring Physicist & Philosopher

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## RESEARCH INTEREST

### Theoretical & Experimental Physics

2004-2024

Quantum Mechanics, General Theory of Relativity, Quantum Field Theory, String Theory, Quantum Gravity, Machine Learning

Driven by an insatiable thirst for understanding the profound workings of existence, I conduct pioneering research at the nexus of physics and philosophy. Driven by an insatiable curiosity to unravel the mysteries of the universe, I have dedicated my academic and professional pursuits to the forefront of modern physics and cutting-edge technology. My fervent interest lies in the intricate realms of Quantum Mechanics, where I thrive on deciphering the fundamental principles governing the microscopic world, and the General Theory of Relativity, where I explore the profound dynamics of space-time curvature. Delving deeper into the quantum realm, I am captivated by the complexities of Quantum Field Theory and its implications on particle interactions, and I am intrigued by the potential unification offered by String Theory, propelling my exploration of higher-dimensional spaces and their implications on the fundamental nature of reality. My enthusiasm extends to Quantum Gravity, where I am driven to comprehend the gravitational force at quantum scales, bridging the gap between the quantum and gravitational realms. In parallel, I am deeply immersed in the realm of Machine Learning, harnessing its power to extract insights from complex data, optimize decision-making processes, and advance scientific discovery. Through interdisciplinary synergy, I aim to leverage the symbiotic relationship between physics and machine learning, driving innovation and pushing the boundaries of human knowledge. With a fervent zeal for exploration and a relentless pursuit of excellence, I am poised to make meaningful contributions at the forefront of scientific inquiry and technological advancement.

## CURRENT POSITION

### Indian Institute of Technology Bhubaneswar

Senior Research Fellow (SRF)

Ph.D Scholar Physics

## RESEARCH HIGHLIGHT

### Heuristic Perspective on Peripatetic of Electromagnetic Waves and Corporeality of Luminiferous Aether

We elucidate the prevalence of hypothetical medium, Spacion (a.k.a luminiferous aether), Spacion-field and hypothetical particle Spaci-boson in the empty space. They fabricated the empty space at the fundamental level culminating in quantifiable pressure and vacuum energy density. We posit and prove an immutable postulate unequivocally that the presence of a medium is an inviolable prerequisite for wave propagation and wave velocity is a characteristic of the medium. We have deciphered an imperfection in the "Special and General Theory of Relativity" that circumscribes the velocity of light in a vacuum; nevertheless, they are inadequate and disproportionate to elucidate the speed limit. Gravity is the curvature of spacetime caused by the presence of mass and energy; nonetheless, there must be measurable matter density and corporeal substance in the empty space which is to be distorted.

### ML error analysis improves optimization: A Monte Carlo study

This is a unique approach where a Machine-learning mechanism is embedded in a metropolis algorithm to find the equilibrium geometry. It helps us to understand the challenges Neural networks face in training the interaction potential of a compound. Sutton-Chen potential has been chosen to mimic the many-body interactions found in metal alloys. Our approach is to study the problems machine learning faces in a compound at the microscopic level and how they can be avoided. The N-atom of the nickel cluster is optimized and compared with earlier results. We began with an initial structure (three different types of initial structure are considered. Such as (a) Linear, (b) Planer, and (c) Spherically distributed) and optimized it iteratively. The desired atomic movement for atomic position optimization is achieved by perturbation to the coordinates. It has been found that if the perturbation is sufficiently small ( $\delta=0.01 \text{ \AA}$ ), the ML can predict with more than 97% accuracy but it takes a large number of iterations to reach the equilibrium geometry. Higher perturbation ( $\delta=0.1 \text{ \AA}$ ) makes calculation faster but it adds a larger amount of ML error which leads to wrong equilibrium geometry. Therefore the right amount of perturbation must be chosen for both speed and accuracy.

## EDUCATION

### Indian Institute of Technology Bhubaneswar

January 2021 joining

Doctor Of Philosophy (Ph.D) Physics ( Pursuing )

### Council of Scientific and Industrial Research (CSIR)

CSIR NET JRF Qualified, All India Rank -201

### Indian Institute of Technology Mandi (Himachal Pradesh)

2018 – 2020

M.sc Physics

Theoretical & Experimental Physics

### University of Delhi

2014 – 2018

Bsc Hons Physics

Physics, Mathematics, Chemistry

### Abhyanand Super - 30

2013

IIT Advance Coaching

### Jawahar Navodaya Vidyalaya Mana Camp Raipur (C.G) we

2010 – 2011

Senior Secondary

### Jawahar Navodaya Vidyalaya Mana Camp Raipur (C.G)

2011 – 2013

Higher Secondary

### Gate Qualified (Physics)

## EXPERIENCE

### Indian Institute of Technology Bhubaneswar

January 2021 joining

Junior Research Fellow

Research Field- Machine learning and Density functional Theory(Physics)

Continuing Phd Physics

### Indian Institute of Competition

2014-2017

Assistant Professor

Physics and Mathematics Faculty

### Indian Institute of Technology Mandi aaqa

August 2019

Project Under Dr Suman Kalyan Pal

Title -Synthesis and characterization of All inorganic Perovskites. I have used hot injection method to synthesis RbPbI3 nanowire. Have synthesized CdSe Quantum Dots,cesium lead bromide,cesium lead bromide cyclodextrin,molybdenum cesium lead bromide,ternary perovskite.We have measured their photo luminescence,photo luminescence excitation ,time correlated single photon counting to measure life time of PL and TEM images.

## INTEL

2007-2011

Intel Learn Program

The Intel® Learn Program is an informal education program designed to develop the technology skills of young learners in developing countries. The program uses creative, technology-based projects to tap into children's interest in their communities, and helps them build the skills needed to create solutions.

### Centre For Social Responsibility And Leadership

2013-14

Volunteer and Student

CSRL takes a step ahead in strengthening the roots of society by nurturing the talented but financially challenged student. I took coaching for IIT JEE exams.

### National Cadet Corp

2008-2010

Cadet

Participated in Combined annual Training Camp held in Udupi Karnataka.Qualified A certificate

## PRESENTATION

### International Conference on Non-Linear Science

#### Abstract & Poster Presentations

Investigation & Prediction of Equilibrium Configuration of Clusters by Machine Learning

#### Conference Presentation

October 2019

Valleytronics: definition & application

Presented PowerPoint regarding earthquake and safety measures

On Origin of Quantum Mechanics

Special Theory of Relativity

## VOLUNTEERING

### Centre For Social Responsibility And Leadership

2013-2014

#### Social Welfare

We make a tree with Title "Joy Of Giving" and collected old and new clothes for drought and flood influenced areas.

## HONORS

### IIT JAM Qualified

### CSIR JRF Qualified

#### CSIR

AIR-201

Selected for Erice International School of Nuclear Physics - August 2019

Regional Chess Player (Bhopal Region) - Stood Champion position - 2011

Merit Certificate in Class Tenth (Obtained 10 CGPA) - 2010-2011

First Price in Science Exhibition - I proved mathematically and practically that the sum of angles of a triangle = 180 degrees. 2007

2nd Price in the Essay competition in Hindi Pakhwada

TATA STEEL QUIZ 2012

Stood third place in speech competition - 2010

National Level Essay Competition - 3rd position 2008

## POSITION AND RESPONSIBILITY

### Camp Senior and Leader in NCC

2009-2010

#### Leader

I was leader among 245 cadet in Combined Annual Training Camp

## PUBLICATIONS

### Adiabatic method to compute ground state configuration: An Optimisation Problem

June 18, 2025

#### Zenodo (Preprint)

[Adiabatic method to compute ground state configuration: An Optimisation Problem](#)

DOI: 10.5281/zenodo.15687285

### Adiabatic method to compute ground state configuration: An Optimisation Problem

June 18, 2025

#### Zenodo (Preprint)

[Adiabatic method to compute ground state configuration: An Optimisation Problem](#)

DOI: 10.5281/zenodo.15687247

### Quantum Theory of Economics

May 7, 2025

#### Zenodo (BOOK)

[Quantum Theory of Economics](#)

DOI: 10.5281/zenodo.15354939

### New Method for High-Accuracy Determination of Time-Span of

October 17, 2023

## Electron-Photon Interaction Based on Quantized Beer's Lambert Absorbance

[Zenodo \(Preprint\)](#)

New Method for High-Accuracy Determination of Time-Span of Electron-Photon Interaction Based on Quantized Beer's Lambert Absorbance

DOI: 10.5281/zenodo.14969880

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## Concerning an Heuristic Point of View on the Origin of the Heisenberg Uncertainty Principle

March 2, 2025

[Zenodo \(Preprint\)](#)

Concerning an Heuristic Point of View on the Origin of the Heisenberg Uncertainty Principle

DOI: 10.5281/zenodo.14955907

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## On The Quantum Mechanics of Vibration Spacetime

September 5, 2021

[Zenodo \(Preprint\)](#)

On The Quantum Mechanics of Vibration Spacetime

DOI: 10.5281/zenodo.14955222

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## Inaugural Method for High-Accuracy Determination of Time-Span of Electron-Photon Interaction Based on Quantized Beer's Lambert Absorbance

October 23, 2023

[Zenodo \(Preprint\)](#)

Inaugural Method for High-Accuracy Determination of Time-Span of Electron-Photon Interaction Based on Quantized Beer's Lambert Absorbance

DOI: 10.5281/zenodo.14922480

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## An Idiotic Thought: Can Bacteria in Human Urine Understand Music and Video Through the Collapse of the Quantum Mechanical Wavefunction?

February 25, 2025

[Zenodo \(Preprint\)](#)

An Idiotic Thought: Can Bacteria in Human Urine Understand Music and Video Through the Collapse of the Quantum Mechanical Wavefunction?

DOI: 10.5281/zenodo.14921758

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## Synthesis and characterization of all inorganic Perovskites

June 18, 2020

Indian Institute of Technology Mandi Kamand, Himachal Pradesh(175005): Masters Thesis

Synthesis and characterization of all inorganic Perovskites

DOI: 10.5281/zenodo.14878574

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## Heuristic Perspective on Peripatetic of Electromagnetic Waves and Corporeality of Luminiferous Aether

February 18, 2025

[Zenodo \(Preprint\)](#)

Heuristic Perspective on Peripatetic of Electromagnetic Waves and Corporeality of Luminiferous Aether

DOI: 10.5281/zenodo.14887585

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## Klip flip mechanics : Extended Quantum Mechanics (Theory of everything physics Book 4)

November 28, 2019

[Kindle](#)

Klip flip mechanics : Extended Quantum Mechanics (Theory of everything physics Book 4)

- ASIN : B08247RKQJ
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## Klip flip mechanics: Filling the holes in quantum mechanics (Theory of everything physics Book 1)

November 30, 2019

[Kindle](#)

Klip flip mechanics: Filling the holes in quantum mechanics (Theory of everything physics Book 1)

- ASIN : B0825Q2NR2
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## Life is fifth force of nature, with force carrier lifeton: Energy is

November 30, 2019

## omnipresent (Theory of everything physics Book 1)

Kindle

Life is fifth force of nature, with force carrier lifeton: Energy is omnipresent (Theory of everything physics Book 1)

- ASIN : B08265S2JF

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## On Quantum Mechanics of Vibrating Bodies: Theory of Everything

August 30, 2021

Kindle

On Quantum Mechanics of Vibrating Bodies: Theory of Everything

- ASIN : B09DYVLMMLV

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## Theory of Everything Physics: Extended String theory (Numbers governs the cosmos Book 1)

November 25, 2019

Kindle

Theory of Everything Physics: Extended String theory (Numbers governs the cosmos Book 1)

- ASIN : B081YHCBCH

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## Theory of Everything Physics: Through the time hole (Throgh the time hole Book 1)

November 25, 2019

Kindle

Theory of Everything Physics: Through the time hole (Throgh the time hole Book 1)

- ASIN : B081ZBW8NM

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## Universe itself is alive , discussion of 26 dimentional spacetime : Ramanujan natural number sum (How? Why? Where ? Big bang Book 1)

November 28, 2019

Kindle

Universe itself is alive , discussion of 26 dimentional spacetime : Ramanujan natural number sum (How? Why? Where ? Big bang Book 1)

ASIN: B0823TVC3C

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## Time is wave, space is also wave: With mathematical proof (Theory of everything physics Book 2)

November 27, 2019

Kindle

Time is wave, space is also wave: With mathematical proof (Theory of everything physics Book 2)

- ASIN : B0822TNQB9