

SRIKRISHNAA JAYARAMAN

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EDUCATION

Indian Institute of Science Education and Research, Kolkata

2015-2020

BS-MS dual degree in Physics

CGPA: 8.25/10

Chettinad Hari Shree Vidyalayam, Chennai

2015

Indian School Certificate

Percentage: 96.4

Chettinad Hari Shree Vidyalayam, Chennai

2013

Indian Certificate of Secondary Education

Percentage: 92.33

FELLOWSHIPS

CSIR-JRF

Eligible to apply

DST-INSPIRE

Fellow throughout the undergraduate course

AREAS OF INTEREST

Physics of Biological Systems, Soft Condensed Matter Physics, Elasticity and Hydrodynamics, Theoretical Condensed Matter Physics and Statistical Mechanics, High Temperature Superconductivity

RELEVANT COURSES

Condensed Matter Physics theory and laboratory, Soft Condensed Matter Physics, Biophysics, Superconductivity, Statistical Mechanics, Evolutionary Dynamics, Quantum Mechanics, Mathematical Methods in Physics, Quantum Field Theory and Electricity, Magnetism and Optics.

EXPERIENCE

Ultrafast Charge Carrier Dynamics of Silver Nanowires

May 2019 - June 2020

MS Thesis

Dr. N Kamaraju, IISER Kolkata

Ultrafast charge carrier dynamics studies in several materials have given important insights into the relaxation dynamics of carriers and possible bandstructure of the material. These studies have led to the effective utilization of these materials in the real world. Nanostructures are ubiquitous in materials sciences due to a high degree of control in the structure during fabrication and their vast scope of applications. At the nanoscale, the charge carrier dynamics vary significantly from the bulk matter counterpart; hence it becomes important to study the ultrafast carrier dynamics of these structures as well. Several studies on metal and semiconductor nanostructures have shown that carrier dynamics are very sensitive to the nanostructure size and shape. This results in a high degree of tunability in the nanostructures for diverse applications. An attempt to study ultrafast carrier dynamics of silver nanowires (AgNW) using pump probe spectroscopy is explained. Numerical simulations of nanoparticle and nanorod pump probe behaviour based on Mie theory and two temperature model were performed. The simulations show that the value of the negative absorption maxima tends to increase when the pump wavelength is decreased and the decay time of the pump probe absorbance signal tends to decrease

with pump fluence. Finally, single beam transmitted light microscopy was performed on MoS₂ powder sample.

Quantum Weak Measurement

Independent Study Project

August - November 2019

Dr. Nirmalya Ghosh, IISER Kolkata

A quantum measurement which does not result in the collapse of the wavefunction into one of the eigenstates is known as weak measurement. In their paper, Aharanov, Albert, and Vaidman discuss weak measurement and illustrate it with a gedankenexperiment on the Stern-Gerlach apparatus. They calculate that depending on the orthogonality of the post selected state from the initial state of the system, the pointer value of the measurement can be far from any of the eigenvalues. Aharanov and several others have proposed and implemented weak measurement in optical systems.

Integer Quantum Hall Effect

Advanced Condensed Matter Physics Semester Project

August - November 2019

Dr. Siddhartha Lal, IISER Kolkata

The calculations explaining the quantized nature of Hall conductivity and hence leading to the integer quantum hall effect, were studied. The role of disorder (introduced into the system via impurities) and the formation of edge states were explored.

TNSA and Mathematical Modelling of Plasma

Summer Internship

May - July 2018

Max Planck Institute for Nuclear Physics, Heidelberg

The project involved solving a system of simultaneous partial differential equations in an attempt to monitor the fusion reaction taking place in stars. This experiment was simulated by Dr. Adriana Palffy and Dr. Yuanbin Wu using an existing fluid model for plasma. I succeeded in replicating their results.

Aharanov-Bohm Effect

Advanced EM and Optics Semester Project

September - November 2018

Dr. P.K. Panigrahi, IISER Kolkata

Airy Wave Packets

Advanced Quantum Mechanics Semester Project

March - April 2018

Dr. P.K. Panigrahi, IISER Kolkata

TEACHING ASSISTANTSHIPS

Thermal Physics

Dr. Arindam Kundagrami, IISER Kolkata

Spring 2020

Physics Laboratory III

Dr. Nirmalya Ghosh and Dr. Chiranjib Mitra, IISER Kolkata

Autumn 2019

TECHNICAL STRENGTHS

Programming Languages

Python with Numpy, MATLAB, and Java

Website

HTML5, CSS, PHP, and MySQL

Data Visualisation

Matplotlib

Typesetting Document

Latex

CONFERENCES

Contemporary Trends in Optics (Co-Opt 2019)

20-23 May 2019

Contemporary Trends in Optics (Co-Opt 2019) held at IISER Kolkata. Organised by SPIE Student Chapter IISER-K and OSA Student Chapter IISER-K.

Vijyoshi 2015 held in Kolkata. Organised by KVPY and INSPIRE. Funded by the Department of Science and Technology, Government of India

EXTRA-CURRICULARS

- Organiser of Cryptek '17 - an international online cryptography puzzle solving quiz event.
- Secretary of AARSHI (2017) - Dramatics Club of IISER Kolkata. Performed in the play "Wedding Album" by Girish Karnad (2016). Directed the play "Are You Watching Me?" by Tony Frier (2018).
- Center topper (Kolkata) of Mimamsa '17, the annual science quiz competition held by IISER, Pune.
- Hobbies: Jogging, Cooking, YouTube, TV shows, Movies and Books. Avid cricket fan and a fan of Borussia Dortmund football club.