Navaneetha Valsan

Navaneetham, Nallur, Feroke Post, Calicut Dist. 673631, Kerala State, India
+91 9562175875, +91 8431836362
valsannavaneetha@gmail.com, navaneethanaslav@gmail.com

EDUCATION

University of Calicut, Malabar Christian College — Calicut, KL, India
Master of Science (MSc) in Physics, CGPA : 3.08/4 — *Aug 2014 - June 2016*

University of Calicut, Govt. Arts and Science College — Calicut, KL, India
Bachelor of Science (BSc) in Physics CGPA : 3.35/4 — *July 2011 - Apr 2014*

State Board of Kerala, Venerini EMGHS School — Calicut, KL, India
Senior Secondary Education, Marks : 1072/1200 — *Jun 2009 - Mar 2011*

State Board of Kerala, Venerini EMGHS School — Calicut, KL, India
Secondary Education — *Jun 2004 - Mar 2009*

RESEARCH EXPERIENCE

Research Scholar — Jul 2019 –
National Institute of Technology, Karnataka (Guide : Prof. N. K. Udayashankar) — *Mangalore, India*

- ***Title : A study on the effect of Zn(II) in mixed lead halide perovskite thin films***

I am currently studying the effect of Zn(II) on the mixed cations and mixed halide perovskite thin films. For this, I have synthesized perovskite thin films with varying doping concentrations using the one-step deposition method in air. The introduction of Zn(II), confirmed by X-ray diffraction (XRD), shows the same absorption and crystal structure after two weeks of storage under ambient conditions. Further, the influence of Zn(II) on photophysical properties, such as photoluminescence and charge carrier lifetime, is being investigated.

An attempt to prepare the material as powder by a solid-solid reaction and single-crystal by inverse temperature crystallization method is also going on.

Mini-project — July 2020 – Dec 2020
Course : Computational Materials Science — *Mangalore, India*
National Institute of Technology, Karnataka (Instructor : Dr. Kartick Tarafder)

- ***Title : DOS and Band structure of GeSe bulk and monolayer***

The project aims at First-principle calculations based on density functional theory to illuminate the band structures of bulk-to-monolayer germanium selenide (GeSe). It is inferred from the literature survey that an indirect to direct bandgap transition happens at a few layers of N = 3 of the monocrystalline GeSe nanosheet. In the present study, a direct bandgap observed in monolayer GeSe bandstructure, absent in bulk band structure, agrees with the reported results.

Mini-project — Sep 2020 – Dec 2020
Course : Computational Materials Physics — *(Online Course)*
Ghent University, Belgium (Instructor : Stefaan Cottenier)

- ***Title : Determining the stability of γ'-Fe_4N crystal structure on the basis of pressure change using DFT***

The project aims to substantiate by DFT using Quantum ESPRESSO, the phase transition exhibited by crystal γ'-Fe_4N under pressure. The γ'-Fe_4N crystal, which belongs to the Pm3m space group at pressure 0G Pa, changes to a P2/m space group with monoclinic symmetry when pressure increases to 10 GPa.

A CIF file for γ'-Fe_4N for both phases is either collected from the existing database or created using information from the literature to conduct convergence testing to determine good computational settings. The total energy of γ'-Fe_4N is calculated as a function of volume and used to predict this crystal's equilibrium volume and bulk modulus. An E(V)-curve (with the energy expressed per volume or per formula unit) is plotted, and the volumes at which the pressures of 10 and 30 GPa have been reached is noted to calculate how much percent has the volume been reduced at a pressure of 10 GPa and of 30 GPa.

Contribution

Created CIF file for γ'-Fe_4N for both phases and obtained the crystal structures using the VESTA crystal viewer. Conducted convergence testing to determine good computational settings.

Master's Project

Nov 2015 – May 2016

Malabar Christian College, Calicut (Guide : Dr. Deepa M.) — *Calicut, India*

- ***Title : Structural studies of Bi-Y-V-Nb-O system***

The project focused on synthesizing and characterizing Bismuth-based pyrochlore compounds by the solid-state method. A series of compounds $Bi_2YV_{1-x}Nb_xO_7$ (x=0.05,0.1,0.15,0.2) are synthesized by solid-state route using an oven for high-temperature heating to encourage reaction. The formation of pyrochlore and the introduction of Nb is confirmed by X-ray diffraction (XRD).

Bachelor's Project

Nov 2013 – May 2014

Govt. Arts and Science College, Calicut (Guide : Asso. Prof. P. K. Rajasekhar) — *Calicut, India*

- ***Title : Wireless Power Transmission by Magnetic Resonance Circuits***

In this project, we investigated the need and usefulness of wireless power transmission and the feasibility of using magnetic inductive coupling as the means for wireless power transmission. Using a working model, we attempted to experimentally demonstrate efficient nonradiative power transfer between two coils over distances of a few inches. The effect of each quality parameter in this method of transmission was measured and compared.

TEACHING EXPERIENCE

Teaching assistant

Jul 2019 –

Dept. of Physics, National Institute of Technology, Karnataka — *Mangalore, India*

Duties include leading section discussions on Physics courses for the class of about 80 engineering students (Special theory of relativity and Electromagnetic Theory), preparing teaching materials (ref: Arthur Beiser, Concepts of Modern Physics and David Griffiths, Introduction to Electrodynamics), grading assignments and exams.

Also supervises Physics lab for graduate-level and engineering students, demonstrated lab experiments, graded lab records, and supervised lab exams

Guest lecturer Jun 2019 – Mar 2019
Dept. of Physics, MAMO College, Calicut *Calicut, India*

Taught semester-long lecture courses to junior and senior undergraduates and non-majors. Designed Physics lab curriculum for senior undergraduates, demonstrated lab experiments, graded lab records, supervised and graded lab exams.

Courses taught

Seniors : Quantum mechanics (ref: Concepts of Modern Physics, Arthur Beiser)
: Nanoscience and technology
: Physics Practical I (Laboratory)
: Physics Practical II (Laboratory)

Juniors : Mechanics (ref: Mechanics, Kittel et al.)
: Methodology of science and basic mechanics

Seniors : Properties of matter & Thermodynamics
: Optics, Laser & Electronics
: Mechanics, Relativity, Waves, and Oscillations
: Electricity, Magnetism and Nuclear physics
: Non-conventional energy sources

Technical assistant (Demonstrator) Dec 2018 – May 2019
Dept. of Physics, National Institute of Technology, Calicut *Calicut, India*

Supervised Physics lab for graduate-level and engineering students, demonstrated lab experiments and supervised lab exams

Teaching assistant Sep 2016 – Nov 2018
Rays Med/Engg entrance coaching center, Calicut *Calicut, India*

Led session discussions for high school students on Physics courses, prepared teaching materials, assignments, and exam question papers.

TECHNICAL COMPETENCY

- Instructed in quantum espresso for Density Functional Theory (DFT) calculations
- Hands-on experience in X-Ray diffraction (XRD), UV-Vis spectrometer, Photo-luminescence spectrometer, spin coating, and Physical Vapour Deposition (PVD) units
- Familiar with python programming language from bachelor's and master's courses
  BSc (Sem 5): Computational Physics CGPA 3/4
  MSc (Sem 2): Computational Physics CGPA 3.11/4
  MSc (Sem 2): Computational Physics Practical CGPA 3.6/4
- Proficiency in popular Windows operating systems, Microsoft word, excel, PowerPoint

FELLOWSHIPS AND GRANDS

Institute fellowship for Research scholar 2019 to present
$5000/yr for five years

ACHIEVEMENTS AND ACTIVITIES

Academic

- UGC-NET (University Grants Commission - National Eligibility Test) 2017 qualified with Lectureship
- Received endowment for academic excellence from Malabar Christian College, Calicut, 2016

Non-academic

- Qualified IELTS (Academics) with a band score of 8.0 (2021)
- Served as Under Officer (UO) of National Cadet Corps (NCC) college unit in 2012-13. C–certificate holder with A grade, attended many Annual Training Camps, National Integration Camp and represented Kerala Directorate in Prime Minister's rally at Delhi (2013)
- Served as School Head Girl (2010-11, 2008-09) and received Best Outgoing Student and Best Outgoing Girl awards (2011) from Venerini EMGHS School, Calicut
- Adventure award certificate winner in District Rally, Barath Scouts and Guides, 2005
- Completed nine years Sri Sathya Sai Bal Vikas Programme of Education in Human Values and passed State level Bal Vikas group examination

SUPERVISORY AND MENTORING EXPERIENCE

- Supervised a master's student during his final year project in our lab: Guided in synthesizing perovskite nanoparticles ($LaFeO_3$) by sol-gel auto combustion and hydrothermal method. Aided in carrying out XRD, SEM, UV-VIS spectroscopic characterizations, and data analysis. Assisted in writing the final project report
- Served as a class tutor for junior undergraduates: led extra discussion sessions for students at request.
- Gave private tutoring for high school students in science subjects

ACADEMIC SERVICES

- Physics resource person for Faculty Development Program organized by SOLVE (Students Online Laboratory through Virtual Experimentation) The Virtual labs, National Institute of Technology, Karnataka in association with Virtual labs, an MHRD (Ministry of Human Resource and Development) Govt. of India initiative
- Offered service as master of ceremony (MC) for International conference (2020) organized by Dept of Physics, National Institute of Technology, Karnataka
- Volunteer of outreaching program series (Principia) at rural school conducted by Dept of Physics, National Institute of Technology, Karnataka
- Extended service as scribe for visually challenged students in exam

REFERENCES

1. Dr. Ajith K. M.
   Associate Professor and Head of the Department
   Dept of Physics, National Institute of Technology, Karnataka
   E-mail: ajith@nitk.edu.in, ajithkm@gmail.com
2. Dr. Kartick Tarafder
   Assistant Professor
   Dept of Physics, National Institute of Technology, Karnataka
   E-mail: karticktarafder@gmail.com, kartick@nitk.edu.in

3. Dr. Suchand Sangeeth C S
   Assistant Professor
   Dept of Physics, National Institute of Technology, Calicut
   E-mail: sangeeth@nitc.ac.in