VISHAL PARMAR

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RESEARCH INTERESTS

Nuclear matter thermodynamics, Phase transition, Neutron star structure and associated properties, physics of neutron star crust and its implications, Constraining Equation of state based on observations, Machine Learning application in nuclear and astrophysics, Magnetic field effects on the structure of neutron star in context to magnetar and pulsar

EDUCATION

2019-Present **PhD**, Thapar Institute of Engineering and Technology, Nuclear Astrophysics
Thesis: *Exploration of Nuclear Matter Properties and Related Thermodynamical Aspects*
Advisor: Prof. S K Patra, Institute of Physics, Bhubaneswar, India
Prof. Manoj K Sharma, Thapar Institite of Engineering and Technology, India

2017-2019 **M.Sc.**, Thapar Institite of Engineering and technology, India, Physics
Thesis: *Liquid-Gas Phase Transition in Nuclear Matter Within Relativistic Mean Field Theory*
Summer Internship: *Institute of Physics, Bhubaneswar, India*

2013-2016 **B.Sc. Hons.** Deshbandhu College, University of Delhi, India, Physics
Project: *A Study of Crop Yield pattern with Climate Change based on Physical Parameters,*

CONTRIBUTED TALKS

2021 DAE Symposia on Nuclear Physics 2021, BARC, Mumbai, India
2021 LXXI International conference"NUCLEUS – 2021, St. Petersburg, Russia
2020 23^{rd} Punjab Science Congress, SLIET Punjab, India

POSTERS

"Effect of Landau quantization of the electron on neutron star crust within effective relativistic mean-field model"

- IWARA2022, 10^{th} International workshop on astronomy and relativitic astrophysics, Antigua Guatemala *September 2022*

"Stability condition in hot symmetric nuclear matter"

- DAE Symposia on Nuclear Physics, Lucknow, India *December 2019*

"Critical parameters of liquid-gas phase transition in symmetric nuclear matter"

- DAE Symposia on Nuclear Physics, Lucknow, India *April 2019*

WORKSHOPS

- *Attendee and organising member* Soliton-22, Workshop on Soliton in Optics, BEC, Plasma and Beyond
  SPMS, Thapar Institute of Engineering and Technology March 2022
- *Attendee,* Lockdown & Distancing Nuclear Physics Seminars
  IOP Nuclear Physics Group Colloquia 2021
- *Attendee,* Workshop on Nuclear Reaction Data Compilation
  M.S. University of Baroda, India November 2019
- *Attendee* Virtual Meeting on "Compact Stars and QCD 2020",
  ICTS, Banglore, India. August 2020
- *Attendee,* ECT* Talent school 2021 on Machine Learning applied to Nuclear Physics, experiment and theory
  Online Edison July 2021
- *Attendee,* Lockdown & Distancing Nuclear Physics Seminars
  IOP Nuclear Physics Group Colloquia 2021

TECHNICAL SKILLS

Computer Languages

- C, Fortran, Python, Matlab, Mathematica, LaTeX, Gnuplot

Operating system

- Windows, Linux (Ubuntu, Fedora, Mint), Unix

Software

- Office, Grace, Origin, Veusz, Github, Kaggle, Google colab

TEACHING EXPERIENCE

Lecturer Contractual in the School of physics and Materials science, Thapar Institute of Engineering and Technology. (Undergraduate course on Applied Physics UPH004, Laboratory and tutorial assignment)

Jan 2020-Present

PAPERS PUBLISHED IN INTERNATIONAL REFEREED JOURNALS

[1] **Vishal Parmar**, H. C. Das , Ankit Kumar et al., *Pasta properties of the neutron star within effective relativistic mean-field model*, Physical Review D, 106, 023031 (2022)

[2] **Vishal Parmar**, H. C. Das , Ankit Kumar et al., *Crustal properties of a neutron star within an effective relativistic mean-field model*, Physical Review D, 105, 043017 (2022)

[3] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Properties of hot finite nuclei and associated correlations with infinite nuclear matter*, Physical Review C, 105, 024316 (2022)

[4] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Thermal effects in hot and dilute homogeneous asymmetric nuclear matter*, Physical Review C, 103, 055817 (2021)

[5] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Critical properties of symmetric nuclear matter in low-density regime using effective-relativistic mean field formalism*, Journal of Physics G: Nuclear and Particle Physics, 48, 025108 (2021)

[6] Neha Grover **Vishal Parmar**, Manoj K Sharma and S K Patra, *Decay dynamics of* $^{9}Be + {}^{8}9\,Y$ *reaction in view of complete and incomplete fusion mechanisms*, Nuclear Physics A, 1011, 122198 (2021)

PAPERS PUBLISHED IN IN INTERNATIONAL/NATIONAL SYMPOSIUM AND CONFERENCES

[1] **Vishal Parmar**, H C Das, Manoj K Sharma and S K Patra, *Effect of Landau quantization of the electron on neutron star crust within effective relativistic mean-field model*, IWARA2022 - 10th International Workshop on Astronomy and Relativistic Astrophysics, Contribution ID: 47

[2] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Limiting temperature of nuclei within effective relativistic mean-field theory*, LXXI International conference "NUCLEUS – 2021", Contribution ID: 100

[3] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Density fluctuation near the critical points in symmetric nuclear matter*, Proceedings of the DAE Symp. on Nucl. Phys. 65 (2021)

[4] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Probable spontaneous decay modes of* ^{254}Es *radioactive nucleus*, AIP Conference Proceedings 2352, 050044 (2021))

[5] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Critical parameters of liquid-gas phase transition in symmetric nuclear matter*, Proceedings of the DAE Symp. on Nucl. Phys. 64 (2019)

[6] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Stability condition in hot symmetric nuclear matter*, Proceedings of the DAE Symp. on Nucl. Phys. 64 (2019)

[7] **Vishal Parmar**, Manoj K Sharma and S K Patra, *Relative relevance of Skyrme forces in reference to barrier characteristics of deformed nuclei*, Proceedings of the DAE Symp. on Nucl. Phys. 63 (2018)

REFERENCES

- Prof. Suresh Kumar Patra
  Nuclear Theory Division, Institute of Physics, Bhubaneswar,
  Sainik School, Bhubaneswar, Odisha-751005, India.
  Email: patra@iopb.res.in

- Prof. Manoj K Sharma
  School of Physics and Materials Science,
  Thapar Institite of Engineering and Technology, India.
  Email: msharma@thapar.edu

- Prof. Paramasivan Arumugam
  Department of Physics, Indian Institute of Technology Roorkee,
  Roorkee-247667, Uttarakhand, India.
  Email: arumugam@ph.iitr.ac.in