

About Me

Qualification :

M.Sc. (Physics), M. Phil. (Physics), Ph.D. (Theoretical Nuclear Physics), Post Doctorate (Nuclear Physics),

PG Diploma in Mass Communication,

SWAYAM 4 Quadrant Course in “Academic Writing” from MOOC’s

Research details

Area of Research and Interest:

1. Nuclear and Radiation Physics
2. Material Physics (theoretical, basically simulation based) and related aspects associated to Nuclear and Radiation Physics.

My abilities in Research, numerical and computational techniques are:

1. As being a theoretician, I am quite good in data analysis. I have performed work on the density dependence of symmetry energy and its effects on heavy-ion collisions (nuclear reactions) at intermediate energies in theoretical domain. Presently working in Nuclear and radiation Physics. Also, carrying out research in the theoretical Material Physics domain.
2. I have a good knowledge of Programming in Fortran, thus capable of developing and executing large computational programs using Fortran and data analysis. I can work on the various softwares like Scientific Linux, ubuntu, Fedora and Red Hat etc.

Research Projects:

1. Co-Investigator in the One Year Project on “**Noise pollution monitoring and its Health Implications in Chandigarh**” sanctioned amount **Rs. 75,000/- (dated 12/09/17)** from the Department of Science and Technology and Renewable Energy, Chandigarh Administration, Sector 19 B, Paryavaran Bhawan (Chandigarh).

Publications

Publications :

1) Published and Accepted papers in peer reviewed journals:

Total: 23

1. Multifragmentation around the transition energy in intermediate energy heavy-ion collisions.
Karan Singh Vinayak and Suneel Kumar
Physical Review C 83, 034614 (2011).
2. Influence of density dependent symmetry energy on Elliptical flow.
Karan Singh Vinayak and Suneel Kumar
European Physical Journal A 47, 144 (2011).
3. Effect of density dependent symmetry energy on fragmentation.
Karan Singh Vinayak and Suneel Kumar
Journal of Physics Conference Series 381, 012032 (2012).
4. On the role of density dependent symmetry energy and momentum dependent interactions in multi-fragmentation.
Karan Singh Vinayak and Suneel Kumar
Physics of Particles and Nuclei Letters 9, 583 (2012).
5. Effect of density dependent symmetry energy on nuclear stopping.
Karan Singh Vinayak and Suneel Kumar
Journal of Physics G: Nucl. Part. Phys. 39, 095105 (2012).
6. Thermalization and temperature reached in heavy-ion collisions using isospin-dependent quantum molecular dynamics model.
Karan Singh Vinayak and Suneel Kumar
European Physical Journal A 48, 96 (2012).
7. Optimizing the rapidity limit for nuclear stopping in intermediate energy heavy-ion collisions.
Karan Singh Vinayak and Suneel Kumar
Physics of Atomic Nuclei 76, 286 (2013).
8. Impact of momentum dependent equation of state and isospin-dependent cross-section on the neutron-proton Pt-differential elliptic flow.

Karan Singh Vinayak, Suneel Kumar
American Institute of Physics (AIP) Proceedings 1524, 228 (2013).

9. Effect of nucleonic cross-section and momentum dependent interactions on first harmonic of anisotropic flow for symmetric collisions.
Anupriya Jain, Karan Singh Vinayak, Suneel Kumar
Annals of Physics 334, 334 (2013).
10. Impact of density dependent symmetry energy and Coulomb interactions on the evolution of intermediate mass fragments.
Karan Singh Vinayak and Suneel Kumar
Pramana Journal of Physics 82, 515 (2014).
11. Analyzing density dependent symmetry energy for mass-asymmetric colliding pairs
Karan Singh Vinayak and Asis K. Chaudhuri
Journal of Physics G: Nuclear Particle Physics 42, 025108 (2015).
12. Density and Temperature evolution in mass-asymmetric reactions.
Deepshikha, Amandeep Kaur, Karan Singh Vinayak, and Suneel Kumar,
AIP Conference Proceedings 1728, 020232 (2016).
13. Isospin dependence of fragment spectra in heavy/super-heavy colliding nuclei at intermediate energies.
Rajiv Chugh, Rohit Kumar, Karan Singh Vinayak
AIP Conference Proceedings 1728,020278 (2016).
14. Analyzing fragment production in mass-asymmetric reactions as a function of density dependent part of symmetry energy.
Amandeep kaur, Deepshikha, Karan Singh Vinayak, Suneel Kumar
Physics of Atomic Nuclei 79, 474-480 (2016).
15. Effect of isospin via. momentum dependent interaction on dynamics of heavy-ion collision.
Karan Singh Vinayak
International Journal of Neo Sciences Vol. 1 (1) 2015.
16. On the Relative Role of Isospin-Dependent Interactions in Fragmentation of Super Heavy Colliding Nuclei.
Rohit Kumar, Karan Singh Vinayak^{*}, and Rajiv Chugh
International Journal of Pure and Applied Physics 13, 44-49 (2017).
17. Review regarding discovery of Super heavy nuclei and related fundamental aspects.
Karan Singh Vinayak,

Bulletin of Pure and Applied Sciences, 36D No. 2, 141-146 (2017).

18. Attenuation coefficient as a probe for choice of operating voltage (dead time, radiation. detection) in GM counter.
Karan Singh Vinayak, Sneha Sharma, Shaminder Singh Sandhu, Paras Agrawal
AIP Conference Proceedings, 2220, 140060 (2020).
19. Reviewing The Fundamental Aspects of The Concept of Neutrino.
Karan Singh Vinayak
Science Phenomenon, 21, Jan-Mar (2019).
20. Simulation, Data Analysis in Physics and Interpretations, Perceptions Affecting Results.
Karan Singh Vinayak
Science Phenomenon, 25, Jan-Mar (2020).
21. Synthesis Techniques for rare Earth doped upconversion Nano-materials for Solar cells – A brief Review
Rinku Kumari, Karan Singh Vinayak, Deepak Kumar, IOP Conf. Series: Earth and Environmental Science 889, 012057 (2021).
22. Radiation Detection with G.M. Counter: A Brief Review
Karan Singh Vinayak,
Bulletin of Pure and Applied Sciences (BPAS) Section D – Physics, 40D, 2 (2021).
23. Fundamental Forces As Different Manifestations Of A Single Particle – A Viewpoint Based On Available Facts & Research.
Mohit Naveen Issar, Paras Agrawal, Rohan Kaushal And Karan Singh Vinayak
The Research Voyage: An International Bi-Annual Peer Reviewed Multidisciplinary Research Journal (Online), Volume 3, No. 2, 14-27 (Dec. 2021).

2) Published Conference Proceedings : 14

24. Reduced NN cross-section and fragment production.
Karan Singh Vinayak and Suneel Kumar,
DAE Symposia for Nuclear Physics, 19-24 December, BITS, PILANI, Vol. 55, 496 (2010).
25. Influence of density dependence of symmetry energy on fragmentation.
Karan Singh Vinayak, Mohinder Singh and Suneel Kumar.
5th Chandigarh Science Congress (CHASCON), 26-28 February,
Panjab University, Chandigarh PS-16, Page-56, (2011).

26. Role of density dependent symmetry energy in nuclear stopping.
Karan Singh Vinayak and Suneel Kumar
DAE symposium for Nuclear Physics, 26-30 December, Andhra University, Vishakhapatnam, Vol. 56, 770 (2010).
27. Effect of density dependent symmetry energy on Elliptical flow.
Suneel Kumar and Karan Singh Vinayak
DAE symposium for Nuclear Physics, 26 - 30 December, Andhra University, Vishakhapatnam, Vol 56, 814 (2011).
28. Neutron-Proton P_t - differential sideward flow as a probe for symmetry energy.
Suneel Kumar and Karan Singh Vinayak.
DAE symposium for Nuclear Physics, 3 - 7 December, University of Delhi, New Delhi, Vol. 57, 704 (2012).
29. On the directed transverse flow and the relation between symmetric and asymmetric collisions.
Karan Singh Vinayak, Rubina Bansal, Suneel Kumar
DAE symposium for Nuclear Physics, 3 - 7 December, University of Delhi, New Delhi, Vol. 57, 698 (2012).
30. Role of isospin momentum dependent interactions in multifragmentation.
Karan Singh Vinayak, Navjot Kaur Virk, Suneel Kumar
DAE Symposium for Nuclear Physics, 2 – 6 December, Bhabha Atomic Research Center, Vol. 58, 336 (2013).
31. Effect of isospin momentum dependent interactions on elliptical flow.
Navjot Kaur Virk, Karan Singh Vinayak, Suneel Kumar
DAE Symposium for Nuclear Physics, 2 – 6 December, Bhabha Atomic Research Center, Vol. 58, 310 (2013).
32. Effect of density dependence of symmetry energy on heavy-ion collisions at intermediate energies.
Karan Singh Vinayak
DAE Symposium for Nuclear Physics, 2 – 6 December, Bhabha Atomic Research Center, Vol. 58, 1014 (2013).
33. Impact of isospin dependence of momentum dependent interactions on global and local thermalization.
Karan Singh Vinayak and Asis K. Chaudhury,

**DAE Symposium for Nuclear Physics, 8 -12 December (2014),
Banaras Hindu University, U.P. Vol. 59, 380 (2014).**

34. Thermalization in non-symmetric heavy-ion reactions
Karan Singh Vinayak, Amandeep Kaur and Suneel kumar
9th Chandigarh Science Congress (CHASCON), 25-27 February,
Panjab University, Chandigarh PP-60, Page-257, (2015).
35. Fragment isotopic content under the influence of isospin momentum dependent interactions.
Navjot Kaur Virk, Karan Singh Vinayak, Suneel Kumar
Proceedings, Zakopane Conference on Nuclear Physics T8, 192 (2014).
31st August – 7th September 2014, Zakopane (Poland).
36. Role of Isospin Momentum Dependent interactions in Extreme Conditions.
Navjot Kaur Virk, Karan Singh Vinayak, Suneel Kumar
Proceedings Indian National Science Academy 81, 1 (2015).
37. Neutron/Proton emission in mass-asymmetric intermediate energy heavy-ion collisions
Amandeep Kaur, Karan Singh Vinayak, Deepshikha and Suneel Kumar
Proceedings DAE Symposium for Nuclear Physics 60, 458 (2015).

3) **Books and Chapters**

38. “Role of IT Tools in Nuclear Physics Simulations”
Karan Singh Vinayak
Chapter in Book “Information Technology and its impact on Society”
[ISBN : 9789386632876], Edition: 2018.

Other details

4) **Contributed Presentations** : 10

Oral Presentations: 02

1. Presented the paper: ‘Influence of density dependence of symmetry energy on fragmentation’
Karan Singh Vinayak, Mohinder Singh and Suneel Kumar
5th Chandigarh Science Congress (CHASCON), 26-28 February,
Panjab University, Chandigarh PS-16, Page-56, (2011).

2. Presented the paper: Effect of density dependence of symmetry energy on fragmentation. Karan Singh Vinayak and Suneel Kumar
Rutherford Centennial Conference on Nuclear Physics, at **University of Manchester, Manchester (U.K.)**

Poster Presentations : 08

3. Reduced NN cross-section and fragment production.
Karan Singh Vinayak and Suneel Kumar.
DAE Symposia for Nuclear Physics, 19-24 December, BITS, PILANI, Vol. 55, 496 (2010).
4. Role of density dependent symmetry energy in nuclear stopping
Karan Singh Vinayak and Suneel Kumar
DAE symposium for Nuclear Physics, 26-30 December, Andhra University, Vishakhapatnam, Vol. 56, 770 (2010).
5. Effect of density dependent symmetry energy on Elliptical flow
Suneel Kumar and Karan Singh Vinayak
DAE symposium for Nuclear Physics, 26 - 30 December, Andhra University, Vishakhapatnam, Vol 56, 814 (2011).
6. Neutron-Proton P_t - differential sideward flow as a probe for symmetry energy.
Suneel Kumar and Karan Singh Vinayak
DAE symposium for Nuclear Physics, 3 - 7 December, University of Delhi, New Delhi, Vol. 57, 704 (2012).
7. On the directed transverse flow and the relation between symmetric and asymmetric collisions.
Karan Singh Vinayak, Rubina Bansal, Suneel Kumar
DAE symposium for Nuclear Physics, 3 - 7 December, University of Delhi, New Delhi, Vol. 57, 698 (2012).
8. Thermalization in non-symmetric heavy-ion reactions
Karan Singh Vinayak, Amandeep Kaur and Suneel kumar
9th Chandigarh Science Congress (CHASCON), 25-27 February, Panjab University, Chandigarh PP-60, Page-257, (2015).

9. Importance of IT tools in Computation and Physical Sciences research (theory & experimental).

Karan Singh Vinayak

**13th Chandigarh Science Congress (CHASCON), 13-17 March,
Panjab University, Chandigarh, Page – 221 (2019).**

10. **Informative review regarding fundamentals of Vanta Black and its applications**

Ishita Goel, Paras Agrawal, Karan Singh Vinayak

**13th Chandigarh Science Congress (CHASCON), 13-17 March,
Panjab University, Chandigarh, Page – 211 (2019).**