

DR PARAMASIVAN ARUMUGAM

DEPARTMENT OF PHYSICS
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE – 247 667, UTTARAKHAND, INDIA

Mobile: +91 8979890366

Phone: +91 1332 28 5712, 4471

Fax: +91 1332 28 6662

Email: aruphfph@iitr.ac.in

Website: <http://faculty.iitr.ac.in/~aruphfph/>



Present position:

Professor at Department of Physics, IIT Roorkee, Since 16 December 2019
Dean of International Relations, IIT Roorkee, Since 11 March 2020.

Previous employments:

- **Associate Dean of International Relations**, IIT Roorkee, from 05 February 2018 to 10 March 2020.
- **Associate Professor** at Department of Physics, IIT Roorkee, from 04 April 2014 to 16 December 2019.
- **Assistant Professor** at Department of Physics, Indian Institute of Technology Roorkee, from 24 July 2008 to 03 April 2014.
- **Post-Doctoral Fellow** at Centro de Física das Interações Fundamentais, Instituto Superior Técnico, Lisbon, from May 2005 to July 2008.
- **Visiting Scientist** at RIKEN, Wako Campus, Saitama, Japan, from 1st August 2005 to 30th August 2005.
- **Post-Doctoral Fellow** at Institute of Physics, Bhubaneswar, India, from July 2003 to May 2005.
- **Research Fellow** at Department of Physics, M.S. University, Tamilnadu, India from October 1998 to June 2003.

RESEARCH INTERESTS

Theoretical Nuclear Physics:

Proton emission, Giant resonances, Hot and rotating nuclei, Covariant DFT, Clustering

Neutron Stars:

Exotic content, Unified Equation of State, Glitches, Pulsar search with radio telescopes

Quantum Coherence:

Gravity mediated gain, nuclear reactions

ACADEMIC DEGREES

Ph.D. in Nuclear Physics

Thesis topic: “Effect of Excitation on Giant Dipole Resonance”

Affiliation: Department of Physics, Manonmaniam Sundaranar University
Tirunelveli – 627 012, India

Thesis submitted on 31 Dec 2002; Degree awarded on 10 Oct 2003

M.Sc. in Physics (Specialization in Nuclear Physics)

Affiliation: Department of Physics, M. S. University, Tirunelveli, India

Year of completion: 1998 % of marks: 77.86

‘O’-level course in Computer Science

Affiliation: Department of Electronics (DOE), Govt. of India.

Year of completion: 1997 % of marks: Between 72 & 80

B.Sc. in Physics (with Mathematics and Chemistry as ancillary subjects)

Affiliation: The M.D.T. Hindu College (M. S. University), Tirunelveli, India

Year of completion: 1996 % of marks: 83.04

SUMMARY OF SCIENTIFIC ACTIVITY

Publications in refereed journals:	51
Publications in conference proceedings:	81
Chapters in book:	7
Books edited:	1
Invited talks:	33
Other talks in conferences abroad:	6
Seminars at important institutions:	17
Supervision of Ph.D./M.Phil./M.Sc. theses:	4/3/11
Conferences organized:	13
Webmaster in conferences:	8

FELLOWSHIPS RECEIVED

1. Post-Doctoral Fellowship from FCT, Govt. of Portugal, from Oct. 2006 to July 2008.
2. Post-Doctoral Fellowship from CFIF, IST, Lisbon, from May 2005 to Sep. 2006.
3. Post-Doctoral Fellowship from IoP, Bhubaneswar, India, from July 2003 to May 2005.
4. Senior Research Fellowship from CSIR, Govt. of India, from August 2002 to June 2003.
5. Junior Research Fellowship from DST, Govt. of India, from October 1998 to March 2001.

TALKS DELIVERED

(a) Invited talks

1. “Microscopic description of triaxially deformed odd-odd proton emitters” – Centenary Celebration Conference on Nuclear Structure and Nuclear Reactions, Aligarh Muslim University, March 2 – 4 (2020).
2. “Quantum Tunneling and Correlations in Atomic Nuclei” – 2nd International Conference on Mathematical Modeling and Computational Methods in Science and Engineering (ICMMCMSE-2020), Alagappa University, Karaikudi, Tamilnadu, January 22 – 24 (2020).
3. “Microscopic description of proton emission from deformed nuclei” – International symposium on “Fundamentals of Nuclear Particle Decay, KTH Royal Institute, Stockholm, Sweden, August 28 – 30 (2019).
4. “Microscopic description of proton emission from triaxial odd-odd nuclei” – 6th International Conference on Proton-Emitting Nuclei, (Chaired by Alex Brown) Michigan State University, USA, June 3 – 7 (2019).
5. “Dense matter properties probed through neutron stars” – Lecture at “*Research Training School in Physics (RTSP) – 2019*”, Department of Physics, Cochin University of Science and Technology, Kerala, January 14 – 16 (2019).
6. “Nilsson Model” – Set of four lectures and two tutorials in the “*School cum Collaboration meeting on Computational Nuclear Structure and Reactions*”, Saha Institute of Nuclear Physics, Kolkata, January 02 – 28 (2018).
7. “Covariant density functional theory” – Set of four lectures and tutorials in the *SERC school on “Nuclear Physics from New Perspectives”*, Department of Physics, Bharathiar University, Coimbatore, Tamil Nadu, February 07 – 27 (2017).
8. “Unified description of structure and decay of proton emitters” – Workshop on *Isomer Studies at the Focal Plane of HYRA*, Inter University Accelerator Centre, New Delhi, September 19 (2016).
9. “Hot and rotating nuclei” – 4 Lectures and 3 Tutorials in the “*SERC School on Modern Microscopic Approaches in Nuclear Physics*”, Kashmir University, Kashmir, May 17 – June 6 (2016).
10. “Proton emitters relevant to astrophysics” – Workshop on *Recent trends in nuclear structure and its implication to nuclear astrophysics*, Puri, January 04 – 08 (2016).
11. “Low energy nuclear physics: An outlook” – Short Term Course on “*Advances in Nuclear and Particle Physics: Present and Future*”, National Institute of Technology, Jalandhar February 8 – 12 (2016).
12. “Proton emission from odd-odd nuclei” – *XXII Nuclear Physics Workshop “Marie & Pierre Curie”*, Kazimierz Dolny, Poland, September 22 – 27 (2015).
13. “Theoretical description of odd-odd proton emitters” – *Fifth International Conference on Proton-emitting Nuclei*, PROCON2015, Lanzhou, China July 6 – 10 (2015).
14. “Proton emission from deformed nuclei” – *Nuclear Physics Meet*, Institute of Physics Bhubaneswar, June 26 – 30 (2015).

15. "Phase transitions in warm and rotating nuclei" – *International conference on "Frontiers in Gamma-Ray Spectroscopy – 2015" (FIG15)*, Variable Energy Cyclotron Centre, Kolkata, February 18-20 (2015).
16. "The links between Neutron Stars and low energy nuclear phenomena" – National Conference on Emerging Challenges in Nuclear and Many-body Physics, Jammu University, Jammu, November 10-11 (2014).
17. "Clustering, Heavy Cluster, spontaneous fission decays and search for Super Heavy Elements" – *DAE-DST Vision meeting for Drawing Roadmap for High Energy and Nuclear Physics Research*, BARC/HBCSE, Mumbai, August 24-25 (2014).
18. "Nuclear Structure Models", 7 Lectures and 8 hours of computer sessions in the "Nuclear Structure School", Inter University Accelerator Centre, New Delhi, April 21-26 (2014).
19. "Selected problems in nuclear structure feasible to study with the aid of HPC", – *HPC User Workshop*, Inter University Accelerator Centre, New Delhi, March 1-2 (2013).
20. "Interesting features of warm nuclei studied through GDR" – *PARIS INDIA Collaboration meeting*, Tata Institute of Fundamental Research, Mumbai, January 10-12 (2013).
21. "Influence of higher order couplings, hyperons and antikaons in the RMF description of neutron stars" – International Conference on Recent Trends in Nuclear Physics, Chitkara University, Barotiwala (H.P.), India. November 19-21, (2012).
22. "Nonadiabatic effects in odd-odd deformed proton emitters" – *The 4th International Conference on Proton Emitting Nuclei and Related Topics*, Bordeaux, France, June 6-10, (2011).
23. "Yet to be observed features of hot and rotating nuclei" – *Workshop on Nuclear Physics using LINAC Booster at IUAC*, New Delhi, India, January 21 - 22, (2011).
24. "Giant dipole resonance in warm and rotating nuclei" – *Theme meeting on Nucleus Nucleus Collisions Around Fermi Energy*, Variable Energy Cyclotron Centre, Kolkata, India, December 16 – 17, (2010).
25. "Precise structure information from proton emission studies" – *National Seminar on Contemporary Trends in Nuclear Physics*, Aligarh, India, October 20 – 21, (2010).
26. "Nuclear structure models: Possibilities with HPC", - HPC User Workshop, Inter University Accelerator Centre, New Delhi, May 24-25 (2010).
27. "Open access codes and theory support at Roorkee" – *School cum Workshop on Nuclear Yrast and Near-Yrast Spectroscopy*, Roorkee, India, October 26-30, (2009).
28. "From finite nuclei to neutron stars in effective field theoretical approach" – *Current Trends in Physics*, Chandigarh, India, March 30 – 31 (2009).
29. "Relativistic mean field study of clustering in nuclei" – *DAE Symposium on Nuclear Physics*, Roorkee, India, December 22 – 26 (2008).
30. "Mean field of triaxial nuclei and application to proton emission" – *Orientation course on Exotic Radioactive Decay and Shell Model*, Roorkee, India, December 21 (2008).
31. "Triaxially deformed proton emitters" – *International conference on Proton Emitting Nuclei and related topics PROCON07*, Lisbon, June 18 (2007).
32. "Nuclear properties at high spin and low temperature" – *International Workshop on Nuclear Structure at the Extremes: New Directions*, Shimla, India, March 21–24 (2005).
33. "GDR in hot rotating nuclei with exact treatment of fluctuations" – *Workshop on Relativistic Mean Field Theory in Nuclear Physics*, Bhubaneswar, India, July (2004).

(b) Other talks in conferences abroad

1. “Pairing fluctuations and giant dipole resonance” – *5th International Conference on Collective Motion in Nuclei under Extreme Conditions (COMEX5)*, Krakow, Poland, September 14-18 (2015).
2. “Neutron stars with hyperons and antikaons: An extended relativistic mean field study” – *Conference on Nuclear Physics in Astrophysics VI*, Lisbon, Portugal, May 19-24 (2013).
3. “Antikaons in extended relativistic mean field study of neutron stars” – *Conference on Nuclear Structure and Dynamics*, Opatija, Croatia, July 9-13 (2012).
4. “EoS from relativistic Mean Field Theory” – 44th Karpacz Winter School of Theoretical Physics on *The Complex Physics of Compact Stars*, Ladek Zdroj, Poland, 18-29 February (2008).
5. “Nonadiabatic quasiparticle description of triaxially deformed proton emitters” – *International Nuclear Physics Conference INPC 2007*, Tokyo, June 5 (2007).
6. “Giant dipole resonance in rapidly rotating hot nuclei with exact treatment of fluctuations” – XXXIX Zakopane School of Physics, *International Symposium on Atomic Nuclei at Extreme Values of Temperature, Spin and Isospin*, Zakopane, Poland, September (2004).

(c) Seminars at important places

1. “Unified approach to nuclear many-body problem: Some fragmented efforts” – Seminar at Yukawa Institute, Kyoto University, Japan, November 14 (2018).
2. “Neutron Stars: Transforming the modus operandi in Nuclear Models” – Indian Physics Association Lecture at IIT Roorkee, October 8 (2012).
3. “Neutron Stars: Complementing Nuclear Models” Seminar at Dept. of Physics, IIT Roorkee, July 26 (2012).
4. “Exotic Phases in Neutron Stars” – Seminar at Centre for Fundamental Interactions in Physics, IST, Lisbon, Portugal on June 25 (2013).
5. “Neutron Stars: Correlations with low energy nuclear phenomena” – Seminar at Centre for Fundamental Interactions in Physics, IST, Lisbon, Portugal on July 5 (2012).
6. “Tools for contemporary research in Physics” – Interaction meeting with students of Sambalpur University, Burla, India, November 6 (2009).
7. “Physics of drip-line nuclei and proton emission” – Theoretical Physics Seminar Circuit seminar at Institute of Physics, Bhubaneswar, India, October 1 (2009).
8. “Unified description of finite nuclei, infinite matter and neutron stars” – Seminar at National Institute of Technology, Hamirpur, HP, India, August 31 (2009).
9. “GDR as a probe for phase and shape transitions in nuclei” – Seminar at Indian Institute of Technology, Roorkee, India, September 3 (2007).
10. “Proton emission from drip-line nuclei” – Seminar at Institute of Physics, Bhubaneswar, India, August 21 (2007).
11. “GDR as a probe for phase and shape transitions in nuclei” – Seminar at Variable Energy Cyclotron Centre, Calcutta, India, August 24 (2007).
12. “Warm and rapidly rotating nuclei – New perspectives” – Seminar at Physics Department, CFIF, Instituto Superior Tecnico, Lisbon, Portugal, May 31 (2005).

13. “Giant dipole resonance in hot rotating nuclei” – Talk in *Commemoration of 60th Birthday of Prof. A. Ansari*, Bhubaneswar, India, January 31 (2005).
14. “Giant dipole resonance and Jacobi transition” – Seminar at *Institute of Physics*, Bhubaneswar, India, August 2004.
15. “Giant dipole resonance and shape fluctuations in excited nuclei” – Seminar at Department of Physics, *Indian Institute of Technology, Roorkee*, India, September 2003.
16. “Study of rapidly rotating hot nuclei” – Group seminar at *Department of Physics, Panjab University*, Chandigarh, India, April 2003.
17. “Giant dipole resonance in excited nuclei” – Seminar at *Institute of Physics*, Bhubaneswar, India, April 2003.

RESEARCH CONTRIBUTIONS

(a) Books edited

1. Proton-Emitting Nuclei and related topics – Editors: L. S. Ferreira and P. Arumugam, AIP Conference Proceedings Vol. 961, 50 (2007) ISBN: 978-7354-0475-5.

(b) In refereed journals:

(b1) Letters:

1. Collective enhancement in nuclear level density
G. Mohanto, A. Parihari, P. C. Rout, S. De, E. T. Mirgule, B. Srinivasan, K. Mahata, S. P. Behera, M. Kushwaha, D. Sarkar, B. K. Nayak, A. Saxena, A.K. Rhine Kumar, A. Gandhi, K Sangita, N. Deb and P. Arumugam
Phys. Rev. C **100**, 011602 (Rapid communication) (2019).
2. Effects of Coriolis and residual neutron-proton interactions in the proton emission from ^{130}Eu
Monika Patial, P. Arumugam, A.K. Jain, E. Maglione and L.S. Ferreira,
Phys. Lett. B **718**, 979 (2013).
3. Evidence of antimagnetic rotation in odd-A ^{105}Cd
D. Choudhury, A. K. Jain, M. Patial, N. Gupta, P. Arumugam, *et al*,
Phys. Rev. C **82**, 061308 (Rapid communication) (2010).
4. Proton emission, gamma deformation, and the spin of the isomeric state of ^{141}Ho
P. Arumugam, L.S. Ferreira and E. Maglione
Phys. Lett. B **680**, 443 (2009).
5. Fine structure in proton radioactivity: An accurate tool to ascertain the breaking of axial symmetry in ^{145}Tm
P. Arumugam, L.S. Ferreira, and E. Maglione
Phys. Rev. C **78**, 041305(R) (Rapid communication) (2008).
6. Clustering in superheavy nuclei within the relativistic mean field approach
B.K. Sharma, P. Arumugam, S.K. Patra, P.D. Stevenson, R.K. Gupta, and W. Greiner
J. Phys. G **32**, L1 (2006).
7. Applicability of shape parameterizations for giant dipole resonance in warm and rapidly rotating nuclei
P. Arumugam, A.G. Deb and S.K. Patra

Europhys. Lett. **70**, 313 (2005).

8. Versatility of field theory motivated nuclear effective Lagrangian approach
P. Arumugam, B.K. Sharma, P.K. Sahu, S.K. Patra, T. Sil, M. Centelles and X. Viñas
Phys. Lett. **B 601**, 51 (2004).

(b2) Regular articles:

9. Signature splitting in the positive parity bands of ^{127}Xe
S. Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, S. Rai, Pragati Popli, Swati Modi, P. Arumugam, Mayank Singh, S. Kumar, A. Kumar, S. S. Bhattacharjee, R. P. Singh, S. Muralithar and R. Palit
Eur. Phys. J. **A 56**, 50 (2020).
10. Rotational band on a three-quasineutron isomer in ^{127}Xe
S. Chakraborty, H. P. Sharma, S. S. Tiwary, C. Majumder, P. Banerjee, S. Ganguly, S. Rai, Pragati, Swati Modi, P. Arumugam, Mayank, S. Kumar, R. Palit, A. Kumar, S. S. Bhattacharjee, R. P. Singh, and S. Muralithar
Phys. Rev. **C 97**, 054311 (2018); *Phys. Rev.* **C 98**, 059902 (2018).
11. Study of the Jacobi shape transition in $A \approx 30$ nuclei
B. Dey, C. Ghosh, D. Pandit, A.K. Rhine Kumar, S. Pal, V. Nanal, R.G. Pillay, P. Arumugam, S. De, G. Gupta, H. Krishnamoorthy, E.T. Mirgule, Surajit Pal, and P. C. Rout
Phys. Rev. **C 97**, 014317 (2018).
12. Decay of ^{147}Tm and the role of triaxiality studied with a nonadiabatic quasiparticle approach
Swati Modi, M. Patial, P. Arumugam, L. S. Ferreira, and E. Maglione
Phys. Rev. **C 96**, 064308 (2017).
13. Giant dipole resonance and shape transitions in hot and rotating ^{88}Mo
A. K. Rhine Kumar, P. Arumugam, N. Dinh Dang, and I. Mazumdar
Phys. Rev. **C 96**, 024322 (2017).
14. Giant dipole resonance studies in Ba isotopes at $E/A \approx 5\text{MeV}$
C. Ghosh, A. K. Rhine Kumar, Balaram Dey, V. Nanal, R. G. Pillay, P. Arumugam, K. V. Anoop, N. Dokania, Abhijit Garai, Ghnashyam Gupta, E. T. Mirgule, G. Mishra, Debasish Mondal, S. Pal, M. S. Pose, and P. C. Rout
Phys. Rev. **C 96**, 014309 (2017)
15. Triaxiality in the proton emitter ^{109}I
Swati Modi, M. Patial, P. Arumugam, E. Maglione, and L. S. Ferreira
Phys. Rev. **C 95**, 054323 (2017)
16. Modified particle-rotor model and low-lying rotational bands in odd-A triaxial nuclei
Swati Modi, M Patial, P. Arumugam, E. Maglione, L.S. Ferreira
Physica Scripta **92**, 094002 (2017)
17. Nonadiabatic quasiparticle approach for rotation-particle coupling in triaxial odd-A nuclei
Swati Modi, M. Patial, P. Arumugam, E. Maglione and L.S. Ferreira,
Phys. Rev. **C 95**, 024326 (2017).
18. Reply to “Comment on ‘Thermal shape fluctuation model study of the giant dipole resonance in ^{152}Gd ’ ”
A.K. Rhine Kumar and P. Arumugam,
Phys. Rev. **C 94**, 049802 (2016)
19. Temperature dependence of the giant dipole resonance width in ^{152}Gd

- C. Ghosh, G. Mishra, A. K. Rhine Kumar, N. Dokania, V. Nanal, R. G. Pillay, Suresh Kumar, P. C. Rout, Sandeep Joshi, and P. Arumugam
Phys. Rev. C **94**, 014318 (2016)
20. Proton emission from the deformed odd-odd nuclei near drip line,
M. Patial, P. Arumugam, A. K. Jain, E. Maglione, and L. S. Ferreira,
J. Physics: Conf. Ser., **665**, 012049 (2016).
 21. Thermal shape fluctuation model study of the giant dipole resonance in ^{152}Gd ,
A.K. Rhine Kumar and P. Arumugam,
Phys. Rev. C, **92**, 044314 (2015).
 22. Effects of thermal shape fluctuations and pairing fluctuations on the giant dipole resonance in warm nuclei,
A.K. Rhine Kumar, P. Arumugam and N. Dinh Dang,
Phys. Rev. C **91**, 044305 (2015).
 23. Spin gated GDR widths at moderate temperatures,
Ish Mukul, P. Sugathan, J. Gehlot, G. Mohanto, A.K. Rhine Kumar, I. Mazumdar, Maninder Kaur, N. Madhavan, S. Nath, R. Dubey, T. Banerjee, N. Saneesh, D.A. Gothe, P. Arumugam, and A. Roy,
EPJ Web of Conferences **86**, 00029 (2015).
 24. Pairing effect in the thermal shape-fluctuation model on the width of the giant dipole resonance
A. K. Rhine Kumar, P. Arumugam, N. Dinh Dang,
Phys. Rev. C **90**, 044308 (2014).
 25. Decoupling the effect of temperature on GDR widths in excited compound nucleus ^{144}Sm
Ish Mukul, A Roy, P Sugathan, J Gehlot, Gayatri Mohanto, S Nath, N Madhavan, R Dubey, T Banerjee, N Saneesh, I Mazumdar, D A Gothe, A K Kumar Rhine, P. Arumugam and Maninder Kaur,
J. Phys. G: Nucl. Part. Phys. **41**, 115103 (2014).
 26. Nonadiabatic description of proton emission from the odd-odd nucleus ^{130}Eu
Monika Patial, P. Arumugam, A. K. Jain, E. Maglione, and L. S. Ferreira,
EPJ Web of Conferences **66**, 02080 (2014).
 27. Nonadiabatic quasiparticle approach for deformed odd-odd nuclei and the proton emitter ^{130}Eu
Monika Patial, P. Arumugam, A. K. Jain, E. Maglione, and L. S. Ferreira
Phys. Rev. C **88**, 054302 (2013). **Highlighted as the editor's suggestion.**
 28. Giant Dipole Resonance in $A \sim 144$ mass region
Ish Mukul, P. Sugathan, I. Mazumdar, J. Gehlot, G. Mohanto, Maninder Kaur, A. K. Rhine Kumar, N. Madhavan, S. Nath, R. Dubey, D. A. Gothe, P. Arumugam and A. Roy
EPJ Web of Conferences **63**, 01020 (2013).
 29. Effect of angular momentum on giant dipole resonance observables in the $^{28}\text{Si} + ^{116}\text{Cd}$ reaction
Ish Mukul, A. Roy, P. Sugathan, J. Gehlot, G. Mohanto, N. Madhavan, S. Nath, R. Dubey, I. Mazumdar, D. A. Gothe, Maninder Kaur, A. K. Rhine Kumar, and P. Arumugam
Phys. Rev. C **88**, 024312 (2013).
 30. Impact of hyperons and antikaons in an extended relativistic mean-field description of neutron stars
Neha Gupta and P. Arumugam
Phys. Rev. C **88**, 015803 (2013).
 31. Neutron stars with antikaons: Comparison between two ways of extending the relativistic mean field models

- Neha Gupta and P. Arumugam
Phys. Rev. C **87**, 045802 (2013).
32. Antikaons in neutron star studied with recent versions of relativistic mean-field models
Neha Gupta and P. Arumugam
J. Phys.: Conf. Ser. **420**, 012154 (2013).
 33. Theoretical studies of nuclei at the proton drip-line
L.S. Ferreira, E. Maglione and P. Arumugam
J. Phys.: Conf. Ser. **420**, 012053 (2013).
 34. "Pasta phases" in neutron stars studies with extended relativistic mean field models
Neha Gupta and P. Arumugam
Phys. Rev. C **87**, 028801 (2013).
 35. Antikaons and higher order couplings in the relativistic mean-field study of neutron stars
Neha Gupta and P. Arumugam
J. Phys. G: Nucl. Part. Phys. **40**, 025203 (2013).
 36. Role of higher order couplings in the presence of kaons in relativistic mean field description of neutron stars
Neha Gupta and P. Arumugam
Phys. Rev. C **85**, 015804 (2012).
 37. Nuclear Structure Studies at the Borders of Stability
L.S. Ferreira, E. Maglione and P. Arumugam
J. Phys.: Conf. Ser. **312**, 092024 (2011).
 38. Nuclear sub-structure in $^{112-122}\text{Ba}$ nuclei within relativistic mean field theory
M. Bhuyan, S.K. Patra, P. Arumugam and R.K. Gupta
Int. J. Mod. Phys. E **20**, 1227 (2011).
 39. Nuclear reaction cross sections of exotic nuclei in the Glauber model for relativistic mean field densities
S.K. Patra, R.N. Panda, P. Arumugam, and Raj K. Gupta
Phys. Rev. C **80**, 064602 (2009).
 40. Isomeric state in ^{53}Co : A mean field analysis
S.K. Patra, F.H. Bhat, R.N. Panda, P. Arumugam, and Raj K. Gupta
Phys. Rev. C **79**, 044303 (2009).
 41. Clusters in light, heavy, super-heavy and super-superheavy nuclei
Raj K Gupta, Sham K. Arun, Dalip Singh, Raj Kumar, Niyti, S.K. Patra, P. Arumugam and B.K. Sharma
Int. J Mod. Phys. E **17**, 2244 (2008).
 42. Nonadiabatic quasiparticle description of triaxially deformed proton emitters
P. Arumugam, E. Maglione and L.S. Ferreira
Phys. Rev. C **76**, 044311 (2007).
 43. Nuclear reaction studies of unstable nuclei using relativistic mean field formalisms in conjunction with the Glauber model
A. Shukla, B. K. Sharma, R. Chandra, P. Arumugam, and S. K. Patra
Phys. Rev. C **76**, 034601 (2007).
 44. Reaction cross-sections for light nuclei on ^{12}C using relativistic mean field formalism
B.K. Sharma, S.K. Patra, R.K. Gupta, A. Shukla, P. Arumugam, P.D. Stevenson, and W. Greiner
J. Phys. G **32**, 2089 (2006).

45. Giant dipole resonance and shape transitions in warm and rapidly rotating nuclei
P. Arumugam, A.G. Deb and S.K. Patra
Euro. Phys. J. A **25**, 199 (2005).
46. Relativistic mean field study of clustering in light nuclei
P. Arumugam, B.K. Sharma, S.K. Patra and R.K. Gupta
Phys. Rev. C **71**, 064308 (2005).
47. Giant dipole resonance and shape fluctuations in rapidly rotating hot nuclei
P. Arumugam, A.G. Deb and S.K. Patra
Acta Phys. Pol. **B36**, 1181 (2005).
48. Giant dipole resonance and Jacobi transition with exact treatment of fluctuations
P. Arumugam G. Shanmugam and S.K. Patra
Phys. Rev. C **69**, 054313 (2004).
49. Shape change in Hf, W and Os-isotopes: A non-relativistic Hartree-Fock versus relativistic Hartree approximation
Z. Naik, B.K. Sharma, P. Arumugam, T.K. Jha and S.K. Patra
Pramana – J. Phys. **62**, 827 (2004).
50. Inclusion of temperature dependent shell corrections in Landau theory for hot rotating nuclei
G. Shanmugam and P. Arumugam
Pramana – J. Phys. **57**, 223 (2001).
51. Rotational co-existence in selenium isotopes
G. Shanmugam, V. Ramasubramanian and P. Arumugam
Pramana – J. Phys. **53**, 457 (1999).

(c) Preprints:

1. The size of most massive neutron stars may reveal its exotic cores – Neha Gupta and P. Arumugam (arXiv:nucl-th/1302.4586).
2. Consistency of nuclear mass formulae – S.K. Patra, P. Arumugam and L. Satpathy (arXiv:nucl-th/0504064).
3. On the stability and the similarity of $N = 82$ isotones – P. Arumugam, S.K. Patra and A. Abbas (arXiv:nucl-th/ 0309034).
4. Role of BCS-type pairing in light deformed nuclei: a relativistic mean field approach – P. Arumugam, T.K. Jha and S.K. Patra (arXiv:nucl-th/ 0311091).

(d) Chapters in book:

1. Non-adiabatic quasi-particle model for deformed proton emitters – P. Arumugam, E. Maglione and L. S. Ferreira, “Proton-Emitting Nuclei”, AIP Conference Proceedings Vol. 681, 50 (2007) ISBN: 978-7354-0475-5.
2. Nuclear properties at high spin and low temperature – P. Arumugam, A. Ganga Deb and S.K. Patra, *Nuclear Structure at the Extremes: New Directions*, Narosa Pub. House (2008) ISBN: 978-81-7319-897-7.
3. Halo and cluster structure of light nuclei – B.K. Sharma, P. Arumugam, A. Shukla and S.K. Patra, *Nuclear Structure at the Extremes: New Directions*, Narosa Pub. House (2008) ISBN: 978-81-7319-897-7.

4. Giant dipole resonance and shape transitions in medium heavy mass nuclei – A. Ganga Deb, P. Arumugam, and S.K. Patra, *Nuclear Structure at the Extremes: New Directions*, Narosa Pub. House (2008) ISBN: 978-81-7319-897-7.
5. Giant dipole resonance in hot rotating nuclei – P. Arumugam, A.G. Deb and S.K. Patra, *Relativistic Mean Field Theory in Nuclear Physics*, Allied Pub. (2006). ISBN:8184240872
6. Recent developments in relativistic mean field theory – S.K. Patra, B.K. Sharma, P. Arumugam, M. Centelles, and X. Viñas, *Relativistic Mean Field Theory in Nuclear Physics*, Allied Pub. (2006). ISBN:8184240872
7. Shell structure, cranking and magnetic phenomena in nuclei – A.K. Jain and P. Arumugam, *Mean Field Description of Nuclei*, Narosa Pub. House (2006). ISBN: 8173197083

(e) In proceedings of conference/symposium/workshop:

1. “Proton emission and triaxiality in ^{147}Tm – Swati Modi, M. Patial, P. Arumugam, L. S. Ferreira, E. Maglione, *DAE Symp. on Nucl. Phys* **63**, 94 (2018).
2. Anomaly in the giant dipole resonance spectrum of ^{28}Si – Balaram Dey, C Ghosh, Deepak Pandit, A.K. Rhine Kumar, S. Pal, V. Nanal, R.G. Pillay, P. Arumugam, S. De, H. Krishnamoorthy, G. Gupta, E.T. Mirgule, Surajit Pal, P.C. Rout, *DAE Symp. on Nucl. Phys* **63**, 446 (2018).
3. Oriented collision between ^{15}B and ^{12}C studied within Glauber model using microscopically calculated densities, Vishal Singh, Swati Modi, P. Arumugam, *DAE Symp. on Nucl. Phys* **63**, 636 (2018).
4. Limiting mass of fastest spinning neutron stars – Ankit Kumar, Abhishek, Swati Modi, P. Arumugam, *DAE Symp. on Nucl. Phys* **63**, 784 (2018).
5. Oriented collision between ^{15}B and ^{12}C studied within Glauber model using microscopically calculated densities – V Singh, S Modi and P Arumugam, *DAE Symp. on Nucl. Phys* **62**, 636 (2017).
6. Proton emission and triaxiality in ^{147}Tm – S Modi, M Patial, P Arumugam, LS Ferreira, E Maglione, *DAE Symp. on Nucl. Phys* **62**, 94 (2017).
7. “Anomaly in the giant dipole resonance spectrum of ^{28}Si ” – B Dey, C Ghosh, D Pandit, AKR Kumar, S Pal, V Nanal, RG Pillay, P Arumugam, S De, H Krishnamoorthy, G Gupta, ET Mirgule, Surajit Pal, PC Rout, *DAE Symp. on Nucl. Phys* **62**, 446 (2017).
8. “Exotic phases and limiting maximum mass of rotating neutron stars” – A Kumar, S Modi, P Arumugam, *DAE Symp. on Nucl. Phys* **62**, 728 (2017).
9. “Microscopic rotation particle coupling for triaxial proton emitters” – Swati Modi, Monika Patial, P. Arumugam, E. Maglione, L.S. Ferreira, *DAE Symp. On Nucl. Phys.*, Kolkata, India, **61**, 200 (2016).
10. “Study of shape transitions and GDR width of ^{88}Mo at high temperature and spin” – A.K. Rhine Kumar, I. Mazumdar, P. Arumugam, *DAE Symp. On Nucl. Phys.*, Kolkata, India, **61**, 306 (2016).
11. “Triaxially deformed proton emitters studied with microscopic rotation particle coupling” – Swati Modi, Monika Patial, P. Arumugam, L.S. Ferreira, and E. Maglione, at *Zakopane Conference on Nuclear Physics „Extremes of the Nuclear Landscape”* in Zakopane, Poland, from August 28 – September 4, (2016).
12. “Nonadiabatic approach with microscopic rotation particle coupling for triaxial proton emitters” – Swati Modi, Monika Patial, P. Arumugam, L.S. Ferreira, and E. Maglione, at *Workshop on Shapes and Symmetries in Nuclei: from Experiment to Theory (SSNET 16)* at Gif-sur- Yvette, France, from November 7- 11, (2016).

13. “Observation of rare shape-phase transition in hot and rotating ^{192}Pt nucleus” – Indranil Mazumdar, M. Dhibar, D.A. Gothe, P.B. Chavan, G. Anil Kumar, A. K. Rhine Kumar, and P. Arumugam – *DAE Symp. On Nucl. Phys.*, Prasanthi Nilayam, AP, India, **60**, 114 (2015).
14. “Study of giant dipole resonance in ^{152}Gd ”; – A. K. Rhine Kumar, Swati Modi, and P. Arumugam, *DAE Symp. On Nucl. Phys.*, Prasanthi Nilayam, AP, India, **60**, 112 (2015).
15. “Theoretical description of odd-odd proton emitters” - Monika Patial, Swati Modi, P. Arumugam, E. Maglione, and L.S. Ferreira, at *XXIII nuclear physics workshop, Marie & Pierre Curie*, Kazimierz Dolny, Poland (2015).
16. Quenching of giant dipole resonance width in ^{97}Tc due to thermal pairing and its fluctuations – A.K. Rhine Kumar, P. Arumugam and N. Dinh Dang., *DAE Symp. On Nucl. Phys.*, Varanasi, India, **59**, 140 (2014).
17. Rotation particle coupling in odd-odd nuclei using the coupling matrix approach – Monika Patial, Swati Modi, P. Arumugam, E. Maglione, L.S. Ferreira., *DAE Symp. On Nucl. Phys.*, Varanasi, India, **59**, 306 (2014).
18. A.K. Rhine Kumar, P. Arumugam and N. Dinh Dang., Pairing fluctuations and the giant dipole resonance, National Conference on Emerging Challenges in Nuclear and Many-body Physics – November 10-11, 2014, Jammu University, India, Book of abstracts, p. 14.
19. Coupling matrix approach for rotation particle coupling – Monika Patial, P. Arumugam, A. K. Jain, E. Maglione, L.S. Ferreira, *DAE Symp. on Nucl. Phys.at New Delhi*, **58**, 260 (2013).
20. Effect of pairing in nuclear level density at low temperatures – A. K. Rhine Kumar, Swati Modi and P. Arumugam, *DAE Symp. on Nucl. Phys.at New Delhi*, **58**, 198 (2013).
21. Evolution of GDR width with angular momentum – Ish Mukul, P. Sugathan, J. Gehlot, G. Mohanto, A. K. Rhine Kumar, Maninder Kaur, I. Mazumdar, S. Nath, N. Madhavan, P. Arumugam, D. A. Gothe, R. Dubey, T. Banerjee, N. Saneesh and A. Roy, *DAE Symp. on Nucl. Phys., New Delhi*, **58**, 108 (2013).
22. Fluctuations induced by pairing and its effect on the giant dipole resonance – A.K. Rhine Kumar and P. Arumugam, *International conference on Recent Trends in Nuclear Physics at Solan, India*, AIP conf. Proc. **1524**, 113 (2013).
23. Influence of higher order couplings, hyperons, and antikaons in relativistic mean field description of neutron stars – Neha Gupta and P. Arumugam, *International conference on Recent Trends in Nuclear Physics at Solan, India*, AIP conf. Proc. **1524**, 224 (2013).
24. Interplay between hyperons and antikaons in E-RMF description of neutron stars – Neha Gupta and P. Arumugam, *DAE Symp. on Nucl. Phys.at New Delhi*, **57**, 630 (2012).
25. Sensitivity of radius of massive neutron stars to their cores – Neha Gupta and P. Arumugam, *DAE Symp. on Nucl. Phys. at New Delhi*, **57**, 604 (2012).
26. Nonadiabatic quasiparticle description of proton emission from the odd-odd nucleus ^{130}Eu – Monika Patial, P. Arumugam, A.K. Jain, E. Maglione, L.S. Ferreira, *DAE Symp. on Nucl. Phys. at New Delhi*, **57**, 214 (2012).
27. Giant dipole resonance in compound nucleus ^{144}Sm – Ish Mukul, I. Mazumdar, P. Arumugam, J. Gehlot, D. A. Gothe, Maninder Kaur, A. K. Rhine Kumar, N. Madhavan, G. Mohanto, S. Nath, P. Sugathan, and A. Roy, *DAE Symp. on Nucl. Phys. at New Delhi*, **57**, 284 (2012).
28. Antikaons in the extended relativistic mean-field models for neutron stars – Neha Gupta and P. Arumugam, *Int. Nucl. Phys. Conf. on Nuclear Structure and Dynamics at Croatia*, AIP conf. Proc. **1491**, 289 (2012).
29. Theoretical studies of exotic drip-line nuclei – L.S. Ferreira, E. Maglione, P. Arumugam, and N. Yu, *IX Latin American Symposium on Nuclear Physics and Applications*, AIP Conf. Proc. **1423**, 35 (2012), DOI: 10.1063/1.3688778.

30. Atlas of nuclear isomers and spin systematics – Monika Patial, Bhoomika Maheshwari, Monalisha Dhibar, A.K. Jain, P. Arumugam, and Balraj Singh, National Conference on Advances in Physics, Roorkee, India, February 24–25 (2012), Book of abstracts, p. 103.
31. Theoretical description of proton decay by nonadiabatic approach – Monika Patial, P. Arumugam, A.K. Jain, E. Maglione and L.S. Ferreria, National Conference on Advances in Physics, Roorkee, India, February 24–25 (2012), Book of abstracts, p. 105.
32. Description of neutron star observables using extended RMF models with kaons – Neha Gupta and P. Arumugam, National Conference on Advances in Physics, Roorkee, India, February 24–25 (2012), Book of abstracts, p. 107.
33. Isoscalar giant quadrupole resonance in hot and rotating nuclei – A.K. Rhine Kumar, Aarti Malhotra and P. Arumugam, National Conference on Advances in Physics, Roorkee, India, February 24–25 (2012), Book of abstracts, p. 113.
34. Kaon condensation in neutron stars studied with recent RMF models – Neha Gupta and P. Arumugam, DAE Symp. on Nucl. Phys., Vishakapatnam, India, **56**,740 (2011).
35. Non-adiabatic approach for odd-odd proton emitters – Monika Patial, P. Arumugam, A.K. Jain, E. Maglione and L.S. Ferreria, DAE Symp. on Nucl. Phys., Vishakapatnam, India, **56**, 222 (2011).
36. Role of thermal shape fluctuations on isoscalar giant quadrupole resonance in hot and rotating nuclei – A. K. Rhine Kumar, Aarti Malhotra and P. Arumugam, DAE Symp. on Nucl. Phys., Vishakapatnam, India, **56**, 436 (2011).
37. Pasta structures in neutron stars – Neha Gupta, I. S. Shabnam and P. Arumugam, DAE Symp. on Nucl. Phys., Vishakapatnam, India, **56**, 702 (2011).
38. Nonadiabatic effects in odd-odd deformed proton emitters – M. Patial, P. Arumugam, A. K. Jain, E. Maglione, and L. S. Ferreira, *The 4th International Conference on Proton Emitting Nuclei and Related Topics*, AIP Conf. Proc. **1409**, 111 (2011), DOI:10.1063/1.3664160.
39. Assigning γ deformation from fine structure in exotic nuclei – L.S. Ferreira, E. Maglione and P. Arumugam, *Frontiers in Nuclear Structure, Astrophysics, and Reactions: Finustar 3*, AIP Conf. Proc. **1377**, 121 (2011) DOI:10.1063/1.3628367.
40. Nuclear Structure Studies of Exotic Nuclei nuclei – L.S. Ferreira, E. Maglione, P. Arumugam, *Second International Ulaanbaatar Conference on Nuclear Physics and Applications*, AIP Conf. Proc. **1342**, 17 (2011). DOI: 10.1063/1.3583161.
41. Empirical determination of all parameters in phenomenological description of giant dipole resonance – Neha Gupta, Ishwar Das, and P. Arumugam, DAE Symp. on Nucl. Phys., Pilani, India, **55**, 234 (2010).
42. Global Systematics of Spins of Nuclear Isomers – Monika Patial, A. K. Jain, P. Arumugam, Balraj Singh, DAE Symp. on Nucl. Phys., Pilani, India, **55**, 138 (2010).
43. Atlas of Nuclear Isomers – Monika Patial, A. K. Jain, P. Arumugam, Balraj Singh, DAE Symp. on Nucl. Phys., Pilani, India, **55**, 136 (2010).
44. Probing the nuclear structure of drip-line nuclei – L.S. Ferreira, E. Maglione, P. Arumugam, *VIII Latin American Symposium on Nuclear Physics and Applications*, AIP Conf. Proc. **1265**, 41 (2010). DOI: 10.1063/1.3480221.
45. Search for anti-magnetic rotation in ^{105}Cd – Deepika Choudhury, Monika Patial, Neha Gupta, A.K. Jain, P. Arumugam, et al, DAE International Symp. on Nucl. Phys., Mumbai, India, **54** (2009).
46. Relativistic mean field study of clustering in nuclei – P. Arumugam, DAE Symp. on Nucl. Phys., India, **53**, 11 (2008).
47. Cross-sections using exotic nuclei in Glauber model for relativistic mean field densities – R. Panda, P. Arumugam, S.K. Patra and Raj K. Gupta, DAE Symp. on Nucl. Phys., India, **53**, 327 (2008).

48. Precise identification of non-axial shapes by proton emission studies – P. Arumugam, L.S. Ferreira, and E. Maglione, *International conference EURORIB08*, Giens, France, June 9–13, (2008), Book of abstracts p. 120.
49. The structure and shape of exotic nuclei beyond the proton drip-line – L.S. Ferreira, E. Maglione, P. Arumugam, in “*Nuclear Physics and Astrophysics: From Stable Beams to Exotic Nuclei*”, Eds. I. Boztosun, A.B. Balantekin, AIP Conference Proceedings 1072, 191 (2008).
50. Triaxial deformations in the proton emitters ^{161}Re and ^{185}Bi – P. Arumugam, E. Maglione, and L.S. Ferreira, in “*Frontiers in Nuclear Structure, Astrophysics and Reactions: Finustar2*”, Eds. P. Demetriou, R. Julin, S.V. Harissopulos, AIP Conference Proceedings 1012, 341 (2008).
51. Triaxially deformed proton emitters – P. Arumugam, E. Maglione, and L.S. Ferreira, *International conference on Proton Emitting Nuclei and related topics PROCON07*, Lisbon, June 17-23, (2007).
52. Nonadiabatic quasiparticle description of triaxial proton emitters – P. Arumugam, E. Maglione and L.S. Ferreira, *International Nuclear Physics Conference, INPC2007*, Tokyo, Japan, June 3 – 8, 2007.
53. Nuclear properties at high spin and low temperature – P. Arumugam, *International Workshop on Nuclear Structure at the Extremes: New Directions*, Shimla, India, March 21–24 (2005) Book of Abstracts, p 21.
54. Halo and cluster structure of light nuclei – B.K. Sharma, P. Arumugam, and S.K. Patra, *International Workshop on Nuclear Structure at the Extremes: New Directions*, Shimla, India, March 21–24 (2005) Book of Abstracts, p. 54.
55. Giant dipole resonance and shape transitions in medium heavy mass nuclei – P. Arumugam, A. Ganga Deb and S.K. Patra, *International Workshop on Nuclear Structure at the Extremes: New Directions*, Shimla, India, March 21–24 (2005) Book of Abstracts, p. 59.
56. Relativistic mean field study of clustering in light nuclei – P. Arumugam, S.K. Patra and R.K. Gupta, DAE Symp. on Nucl. Phys., India, **47B**, 74 (2004).
57. Halo structure of exotic nuclei – B.K. Sharma, P. Arumugam and S.K. Patra, DAE Symp. on Nucl. Phys., India, **47B**, 112 (2004).
58. Proton radioactivity from excited nuclei – S.R.K. Venkataraman, P. Arumugam and S.K. Patra, DAE Symp. on Nucl. Phys., India, **47B**, 110 (2004).
59. Applicability of shape parameterizations for giant dipole resonance in warm and rapidly rotating nuclei – P. Arumugam, A.G. Deb and S.K. Patra, DAE Symp. on Nucl. Phys., India, **47B**, 34 (2004).
60. Giant dipole resonance in rapidly rotating hot nuclei with exact treatment of fluctuations – P. Arumugam and S.K. Patra, *XXXIX Zakopane School of Physics, International Symposium on Atomic Nuclei at Extreme Values of Temperature, Spin and Isospin*, Zakopane, Poland, August 31 – 5 September 2004, Book of abstracts, p. 34.
61. GDR in hot rotating nuclei with exact treatment of fluctuations – P. Arumugam, *Workshop on Relativistic Mean Field Theory in Nuclear Physics*, Bhubaneswar, India, July 26–31, 2004, Book of Abstracts, p. 23.
62. Effective field theory Lagrangian approach: A complete relativistic nuclear model – P. Arumugam, B.K. Sharma, S.K. Patra, Tapas Sil, M. Centelles, and X. Vinas, *Workshop on production and utilization of radioactive ion beams from ISOL type facilities*, Puri, India, February 16–19, 2004.
63. Field theory motivated effective Lagrangian approach: towards a complete relativistic nuclear model – S.K. Patra, B.K. Sharma, P. Arumugam, P. K. Sahu, X. Vinas, M. Centelles and T. Sil, *Proceedings of International Nuclear Physics Conference*, Goteborg, Sweden, June 27–July 2, 2004.
64. Giant dipole resonance and Jacobi transition leading to hyperdeformation – P. Arumugam and S.K. Patra, *International Nuclear Physics Conference*, Goteborg, Sweden, June 27–July 2, 2004, Book of Abstracts, p.278.

65. A cluster decay model for proton radioactivity from dripline nuclei – S.R.K. Venkataraman, P. Arumugam, S.K. Patra and Raj K. Gupta, *International Conference on Exotic Nuclei and Atomic Masses*, (ENAM04), Georgia, USA, September 12-16, 2004.
66. Proton radioactivity in lighter mass nuclei – S.R.K. Venkataraman, P. Arumugam and S.K. Patra, DAE Symp. on Nucl. Phys., India, **46B**, 58 (2003).
67. On stability and the similarity of $N = 82$ isotones – P. Arumugam, S.K. Patra and A. Abbas, DAE Symp. on Nucl. Phys., India, **46B**, 60 (2003).
68. Giant dipole resonance as a probe for hyperdeformation through Jacobi transition – P. Arumugam and S.K. Patra, DAE Symp. on Nucl. Phys., India, **46B**, 156 (2003).
69. Effective field theory: A complete relativistic nuclear model – P. Arumugam, B.K. Sharma, P.K. Sahu and S.K. Patra, DAE Symp. on Nucl. Phys., India, **46B**, 402 (2003).
70. Phase transition in an effective field theory – B.K. Sharma, P. Arumugam, P.K. Sahu and S.K. Patra, DAE Symp. on Nucl. Phys., India, **46B**, 402 (2003).
71. Effect of excitation on giant dipole resonance – P. Arumugam, DAE Symp. on Nucl. Phys., India, **45B**, 566 (2002).
72. Level densities and single-particle distributions in hot nuclei – G. Shanmugam and P. Arumugam, DAE Symp. on Nucl. Phys., India, **44B**, 106 (2001).
73. Role of fluctuations on giant dipole resonance cross sections – G. Shanmugam and P. Arumugam, DAE Symp. on Nucl. Phys., India, **44B**, 142 (2001).
74. Pairing fluctuations in the high-K isomer ^{178}W – G. Shanmugam and P. Arumugam, DAE Symp. on Nucl. Phys., India, **44B**, 144 (2001).
75. Role of fluctuations on giant dipole resonance – G. Shanmugam and P. Arumugam, Proceedings of the Workshop on Physics with Large Gamma Array coupled with Recoil Separator, Varanasi, September (2001).
76. Role of fluctuations on shape transitions in zirconium isotopes – G. Shanmugam and P. Arumugam, DAE Symp. on Nucl. Phys., India, **43B**, 126 (2000).
77. Inclusion of temperature dependent shell corrections in Landau theory for hot rotating nuclei – G. Shanmugam and P. Arumugam, Proceedings of the International Workshop on Physics with Multi Detector Arrays, Calcutta, November 2000, p.26.
78. Oblate band in ^{125}I – Hariprakash Sharma, B. Sethi, Ranjana Goswami, P. Banerjee, R.K. Bhandari, Jahan Singh, G. Shanmugam, V. Ramasubra-manian and P. Arumugam DAE Symp. on Nucl. Phys. India, **42B**, 37 (1999).
79. Mechanical design of detector assembly for isomer tagging experiments with heavy ion beams – B. Sethi, P. Arumugam, H.P. Sharma, S.R. Banerjee, P. Banerjee, and A. Goswami, Saha Institute of Nuclear Physics, Calcutta - Annual Report 1998-99.
80. Giant Dipole Resonance as a probe for detecting Jacobi Transition in the Zirconium Isotopes - G. Shanmugam, P. Arumugam and V. Ramasubramanian, DAE Symp. on Nucl. Phys. India, **41B**, 100 (1998).
81. Rotational co-existence in selenium isotopes – G. Shanmugam, V. Ramasubramanian and P. Arumugam, *International Workshop on Rare Nuclear Processes*, New Delhi, November 16 –20, 1998, Book of abstracts, p.47.

HIGHLIGHTED CITATIONS

- Nature **487**, 341 (2012): How atomic nuclei cluster – J.-P. Ebran, E. Khan, T. Nikšić, and D. Vretenar
- Astron. & Astrophys. **553**, A22 (2013): Phase transitions in dense matter and the maximum mass of neutron stars – N. Chamel, A. F. Fantina, J. M. Pearson and S. Goriely
- Rev. Mod. Phys. **89**, 015007 (2017): Equations of state for supernovae and compact stars – M. Oertel, M. Hempel, T. Klähn, and S. Typel
- Rev. Mod. Phys. **84**, 567 (2012): Radioactive decays at limits of nuclear stability – M. Pfützner, M. Karny, L. V. Grigorenko, and K. Riisager
- Rep. Prog. Phys. **82**, 056301 (2019): Pairing in excited nuclei: a review – N. Quang Hung, N. Dinh Dang, and L. G. Moretto
- Phys. Rev. Lett. **120**, 212502 (2018): Puzzling Two-Proton Decay of ^{67}Kr – S. M. Wang and W. Nazarewicz
- Phys. Rev. Lett. **119**, 192503 (2017): Discovery of ^{72}Rb : A Nuclear Sandbank Beyond the Proton Drip Line – H. Suzuki *et al.*
- Phys. Rev. Lett. **114**, 092301 (2015): Hyperon Puzzle: Hints from Quantum Monte Carlo Calculations – D. Lonardoni, A. Lovato, S. Gandolfi, and F. Pederiva

DETAILS OF THESES SUPERVISED

Sl.	Degree	Title of thesis	Year	Name of the scholar
1.	Ph.D.	Relativistic Mean Field Description of Exotic Phases in Neutron Star	2013	Neha Gupta (Faculty, VMO Univ., Kota)
2.	Ph.D.	Proton emission from two quasiparticle states in deformed odd-odd nuclei (Co-supervisor: Prof. A.K. Jain, Dept. of Physics, IIT Roorkee)	2013	Monika Patial (Post-doc, KTH, Stockholm)
3.	Ph.D.	Giant resonance built on excited states of nuclei	2015	A.K. Rhine Kumar* (Post-doc, Mississippi State University)
4.	Ph.D.	Microscopic description of triaxially deformed proton emitters	2017	Swati Modi (Faculty, BIT Sindri, Dhanbad)
5.	Ph.D.	Microscopic description of deformed odd-odd proton emitters	Ongoing	Pooja
6.	Ph.D.	Microscopic description of Giant Dipole Resonances	Ongoing	Abhishek
7.	Ph.D.	Quantum Coherence in Nuclear Reactions	Ongoing	Ankit Kumar
8.	Ph.D.	To be decided (Neutron Stars)	Ongoing	Jaikhomba Singha
9.	Ph.D.	To be decided (Two-proton emission)	Ongoing	Shivam Gakkhar
10.	Ph.D.	To be decided (Giant Resonances)	Ongoing	Manish Kumar Bairwa

* CVK Baba award (Indian Physics Association) for the best thesis presentation in Nuclear Physics – 2015

Sl.	Degree	Title of thesis	Year	Name of the scholar
1.	M.Sc.	Systematics in the depth of Woods-Saxon potential studied using proton emission data	2009	Jasmine Sethi
2.	M.Sc.	Giant Quadrupole Resonance	2011	Aarti Malhotra
3.	M.Sc.	Neutron star and equation of state	2011	Shabnam. I. S.
4.	M.Sc.	Quark hadron phase transition in Neutron stars	2012	Bhumika Thakur
5.	M.Sc.	Fission in rapidly rotating nuclei	2013	Vinay Suram
6.	M.Sc.	Clustering in atomic nuclei	2014	Anu Kundu
7.	M.Sc.	Towards a formal description of pairing in giant dipole resonance	2015	Garima Arora
8.	M.Sc.	Microscopic description of giant dipole resonance	2016	Rajiv G Pereira
9.	M.Sc.	A qualitative study of rotating neutron stars	2017	Ankit Kumar
10.	M.Sc.	Searching for Pulsars using the upgraded GMRT	2017	Boris Kalita
11.	M.Sc.	Deformation in a rotating gravitating object at large angular momentum	2018	Mohit Kumar

Supervised three M.Phil. theses for the students of Manonmaniam Sundaranar University, Tirunelveli.

Sl.	Degree	Title of thesis	Year	Name of the scholar
1.	M.Phil.	Hexadecapole deformations in excited nuclei	2004	A. Sivagami Sundari
2.	M.Phil.	Clustering aspects in heavy nuclei	2005	E. Kumar
3.	M.Phil.	Macroscopic description of giant dipole resonance	2005	R. Swarnalatha

COLLABORATORS

Other than the students listed above and those frequently co-authored publications

- Prof. G. Shanmugam, (Ph.D. Supervisor), M.S. University, Tirunelveli
- Prof. Suresh K. Patra (Post-Doc host), Institute of Physics, Bhubaneswar
- Prof. Lidia S. Ferreira, (Post-Doc host), Instituto Superior Tecnico, Lisbon, Portugal
- Prof. Enrico Maglione, INFN, University of Padova, Italy
- Prof. Nguyen D. Dang, RIBF, RIKEN, Saitama, Japan
- Prof. Raj K. Gupta, Dept. of Physics, Punjab University, Chandigarh
- Prof. Xavier Vinas, Dept. of Physics, Univ. Barcelona, Spain
- Prof. Ashok K. Jain, Dept. of Physics, IIT Roorkee
- Prof. Vandana Nanal, DNAP, TIFR, Mumbai
- Prof. Indranil Mazumdar, DNAP, TIFR, Mumbai
- Prof. Hari Prakash Sharma, Dept. of Physics, BHU, Banaras
- B.K. Sharma, Z. Naik, M. Bhuyan, A.G. Deb, T.K. Jha, R.N. Panda, (Ph.D. Students at Institute of Physics, Bhubaneswar, during the period of joint publications)
- P.K. Sahu, A. Shukla, R. Chandra (Post-Docs at Institute of Physics, Bhubaneswar, during the period of publications)

SCHOOLS/CONFERENCES ORGANIZED

Sl.	Conference Name	Sponsored By	Role	Date
1.	Physics Cases and Instrumentation for the EURISOL-DF, next step towards Eurisol	CERN, EU	Member, local org. com.	Nov. 15-16, 2017
2.	Indo-Japan Accelerator School (IJAS2017)	DST-SERB, Govt. of India	Member, org. com.	March 9-11, 2017
3.	SERC School on “Modern theories of Nuclear Structure”, IIT Roorkee	DST-SERB, Govt. of India	Director	Feb. 23-March 5, 2015
4.	VI International Conference FUSION14	IUAC, DST, Govt. of India	Member, org. com.	Feb. 24-28, 2014
5.	DAE-BRNS Symposium on Nuclear Physics, BARC, Mumbai	DAE-BRNS	Member, org. com.	Dec. 02-06, 2013
6.	SERC School on "Modern theories of Nuclear Reactions, IIT Roorkee	DST-SERC, Govt. of India	Co-director	Sep. 23-Oct. 4, 2013
7.	International Conference on Recent Trends in Nuclear Physics, Chitkara University	DST, DAE, Chitkara Univ.	Member, org. com.	Nov. 19-21, 2012
8.	National Conference on Advances in Physics, IIT Roorkee	DAE-BRNS, CSRI, IITR	Co-convenor	Feb. 25-26, 2012
9.	SERC School on "Modern trends in Nuclear structure and dynamics, IIT Roorkee	DST-SERC, Govt. of India	Co-director	Feb. 06-24, 2012
10.	Interaction Meeting on Theoretical Nuclear Physics, IIT-Roorkee	DST, Govt. of India	Co-convenor	Sep. 03-05, 2010
11.	School cum workshop on Nuclear Yrast and Near Yrast States, IIT-Roorkee	DAE-BRNS, UDCSR Kolkata	Secretary	Oct. 26-30-2009
12.	DAE-BRNS Symposium on Nuclear Physics, Roorkee	DAE-BRNS	Secretary, LOC	Dec. 22-26, 2008
13.	International Conference on Proton Emitting Nuclei and related topics, Lisbon	FCT, FCG, FLA, Portugal	Member, Org. Comm.	Jun. 17-23, 2007

SPONSORED RESEARCH PROJECTS

Sl.	Title of Project	Funding Agency	Financial Outlay	Year of start & period	Name of P.I. and other investigators	Status
1.	The structural properties of atomic nuclei at extreme conditions	SPARC	₹ 49 Lacs	2020	P. Arumugam, A.K. Rhinekumar, T. Nakatsukasa, G. Colo	Under preparation

Sl.	Title of Project	Funding Agency	Financial Outlay	Year of start & period	Name of P.I. and other investigators	Status
2.	Microscopic description of proton emitters relevant to astrophysics	SPARC	₹ 49 Lacs	2020	P. Arumugam, S. Modi, L.S. Ferreira, E. Maglione	Under preparation
3.	Low-Energy Cost-Effective Tabletop Ion Accelerator	IITR	₹ 45 Lacs	2018 3 years	P. Arumugam, Puneet Jain, K.L. Yadav, Kaushik Pal, R.M. Sai	In Progress
4.	Microscopic description of triaxially deformed odd-odd Proton emitters	CSIR	₹ 10.23 Lacs	2015 4 years	P. Arumugam	Completed
5.	Mapping the low temperature and low spin phase diagram of atomic nuclei	SERB, DST	₹ 13.464 Lacs	2015 4 years	P. Arumugam, A.K. Gourishetty, I. Mazumdar, A. Maj, M. Kmiecik, K. Mazurek	Completed
6.	SERC School on Nuclear Physics, DST-SERB	SERB, DST	₹ 13.615 Lacs	2014 2 years	P. Arumugam, P.C. Srivastava	Completed
7.	Warm and rotating nuclei at the limits of stability	SERB, DST	₹ 13.32 Lacs	2012 3 years	P. Arumugam	Completed
8.	Decay spectroscopy of exotic nuclei CERN/FP/123606/2011	FCT Portugal	€ 15,000	2011 1 year	L.S. Ferreira, E. Maglione, P. Ring, P. Arumugam, N. Yu	Completed
9.	Exotic decays with relativistic microscopic interactions CERN/FP/109319/2009	FCT Portugal	€ 10,000	2010 1 year	L.S. Ferreira, E. Maglione, P. Ring, P. Arumugam	Completed
10.	GDR in warm and rotating nuclei	SRIC, IITR	₹ 4.0 Lacs	2009 3 years	P. Arumugam,	Completed
11.	Search for neutron emission in exotic nuclei POCI/FP/81978/2007	FCT Portugal	€ 10,000	2007 1 year	L.S. Ferreira, M.C. Lopes, P. Arumugam	Completed
12.	Nuclear Physics beyond the drip-lines PTDC/FIS/68340/2006	FCT Portugal	€ 76,398	2007 3 years	L.S. Ferreira, E. Maglione, M.C. Lopes, P. Arumugam, P.M. Walker, A.K. Jain, N.D. Dang	Completed
13.	Single-particle and collective aspects of nuclei at extremes of iso-spin, spin and temperature SFRH/BPD/26642/2006	FCT Portugal	€ 34,390	2006 3 years	P. Arumugam, L.S. Ferreira, E. Maglione	Completed
14.	Effect of excitation on giant dipole resonance CSIR-SRF: 9/652(10)/2002-EMR-I.	CSIR, India	₹ 0.7 Lacs	2002 1 year	P. Arumugam	Completed

SIGNIFICANT CONTRIBUTION/INNOVATIONS THROUGH RESEARCH

(a) Hot and rotating nuclei in Nilsson-Strutinsky approach:

Our formalism developed to study hot and rotating nuclei is one among the best and it is the most advanced tool to study giant dipole resonance in such nuclei. A long-standing issue of the order of pairing phase transition has been addressed and we suggest a second order due to the thermal fluctuations in the pairing field. This has fundamental implications in many thermodynamical systems. In contrast to previous predictions, we have proved that with a careful treatment of fluctuations, the giant dipole resonance observation in hot nuclei could be more precise in yielding structure information. This, in turn, leads to the prediction of hyperdeformed states, in few nuclei, which are yet to be observed to bring out the similarity with gravitating rotating stars.

(b) Unified description of finite nuclei and infinite nuclear matter:

We have shown for the first time that in a relativistic mean field (RMF) approach, with a systematic inclusion of new interaction terms under the guidance of EFT techniques, and without forcing any change of the parameters initially determined from a few magic nuclei, one can explain finite nuclei and nuclear matter in a unified way with a commendable level of accuracy in both the cases. This approach could be considered as a salient step towards a unified theory for finite nuclei as well as for infinite nuclear matter.

For the first time, we have demonstrated that the clustering structure of several light mass nuclei could be well explained by the RMF theory. We have successfully extended our model to study the reaction cross-sections of exotic nuclei.

(c) Microscopic rotation particle coupling:

So far, the rotation particle coupling has been carried out only with constant/ variable moment of inertia approach for odd-odd nuclei. We have developed a new formalism named as the coupling matrix approach where the matrix elements of the collective Hamiltonian could be directly coupled to the spectrum of the core, leading to an accurate description.

(d) Microscopic description of proton emission:

Recently, we have developed a proper formalism for odd-odd proton emitters, which is more complete especially in treating the residual interactions and the coupling with the daughter nucleus states. Several interesting predictions are made where the role of residual np interaction could strongly influence the proton emission process.

(e) Exotic phases in neutron stars:

We have extended the RMF models, which are successful in the finite nuclear regime, to explain the properties of neutron stars (NS) in the presence of exotic matter like that of antikaons and hyperons. We have shown that, for the most massive neutron star, with a precise observation of its radius it is possible to ascertain the presence of exotic cores.

IMPORTANT CODES WRITTEN ORIGINALLY

1. Temperature-dependent cranked Nilsson-Strutinsky method
 - a) Temperature-dependent liquid drop model
 - b) Triaxial Nilsson model
 - c) Cranking model for high-spin states
 - d) Strutinsky smearing at finite temperature and spin
 - e) Temperature and spin-dependent pairing
2. Thermal fluctuation model with orientation fluctuations.
3. Macroscopic model for giant dipole resonances.
4. Finite temperature relativistic Thomas-Fermi model.
5. Particle Rotor Model
(Triaxial rotor and particle in triaxially deformed ($\beta_2, \beta_4, \beta_6, \gamma$) mean field with all nonadiabatic and quasiparticle effects)
6. Proton emission by microscopic approach.

INTERDISCIPLINARY PROJECT WORKS DONE

1. “Programming with GUI - Application to Problems in Physics”

Period: Sep-1997 to Dec-1997.

Using Visual Basic 5.0 as a graphical user interface (GUI), some problems of interest in Physics were tackled. The problems cover various topics in advanced Physics such as small oscillations, Monte-Carlo techniques, Rutherford scattering, Giant Dipole Resonance (GDR) in Nuclei and Chaotic Dynamics, all represented graphically. The effectiveness of MS-Excel as a computing cum graphical tool for scientific purposes was analyzed in the case of low-temperature conductivity study of crystals.

2. “Database Access with Visual Basic 6 – Application to Secondary Structure Prediction by Deviation Parameter (SSPDP)”

Collaborators: S.A. Mugilan and G. Suresh, (Research Scholars at Tirunelveli).

Period: Feb-2001 to Apr-2001.

A software package (SSPDP-MSA) has been developed to predict the given protein structure by the method SSPDP using MS Access 97 as back end and MS Visual Basic 6 as front end. SSPDP-MSA turned out to be a user-friendly tool for the people belonging to the Biophysics, Biochemistry and Biotech research community. The uniqueness of SSPDP-MSA is its graphical output. Amazingly SSPDP-MSA takes a few seconds to analyze a protein whereas the contemporary codes consume several hours.

National and international awards

- Selected as one among the best three thesis presentations in the Department of Atomic Energy (DAE) National Symposium on Nuclear Physics, 2002
- Obtained Young Scientist Award (a research grant) from Department of Science and Technology, Govt. of India, in April 2012.

Membership of academies

- Life member – Indian Physics Association
- Life member – Indian Association of Physics Teachers
- Associate Member – European Centre for Theoretical Studies in nuclear physics and related areas ECT*
- Integrated member of Centro de Física e Engenharia de Materiais Avançados, Instituto Superior Técnico, Lisbon, Portugal (UID/CTM/04540/2019)

Participation and cooperation in international networks

- Participant in NuSTAR and PARIS collaborations
- GMRT observations for pulsar searches

Actively collaborating with the following researchers (outside India)

- N.D. Dang, RIKEN, Saitama, Japan
- Lidia S. Ferreira, Instituto Superior Técnico, Lisbon, Portugal
- Enrico Maglione, INFN, Padova, Italy
- Xavier Viñas, Univ. Barcelona, Spain
- Tomasz Paterek, Nanyang Technological University, Singapore

Scientific qualifications of non-academic nature

- Good expertise in arranging conferences and meeting as I have organized more than 10 such events
- I have written my own DBMS software to handle conference data
- I have working knowledge in system administration over different platforms

Other scientific leadership or development work

- I have been an integral part of founding and maintaining the centre for nuclear theory in India (www.cnt.net.in)
- Spokesperson of the Indian working group in mean field theories, DFT/RMF.

Other professional assignments of an administrative nature.

- Associate Dean of International Relations (Since February 2018)
- Coordinator, Thomso 2017 (Cultural fest of IIT Roorkee)
- Co-Cordinator, Thomso 2016
- Faculty in Charge of the Computer Lab (Since July 2012)
- Deputy Faculty in Charge of the Computer Lab (From 2009 to 2011)
- Webmaster and database in-charge in about 10 conferences/workshops
- Webmaster of the centre for nuclear theory in India (www.cnt.net.in)
- Faculty in Charge for the department timetable (July 2015 – June 2018)
- Department Faculty in Charge of Placement & Training (From July 2010 to June 2011)
- Member, Reports & Website Committee (Since July 2012)
- Exam Coordinator for Physics, Autumn 2012-13
- Faculty Advisor for Physics, Cognizance 2011 (Technical fest of IIT Roorkee)
- Member, Department Research Committee (2010-12)
- Member, Department Academic Programme Committee (2013-15)
- Member, Department Administrative Committee (2016-19)

ACCOUNT OF OWN PEDAGOGICAL EXPERIENCE:

I am fond of teaching and I have learnt a lot while teaching during different periods of my career.

During my Ph.D., (1998-2002) I taught one-fourth of the nuclear physics courses. I have taught the following topics during that period for the Masters' students:

- *Accelerators* and *elementary particle physics* in the basic course on Nuclear Physics
- *Detectors* and *angular momentum theory* in the advanced course on Nuclear Physics

After joining at IIT Roorkee, I have been teaching several courses as briefed below.

For degree students in Engineering (B.Tech.)

Usually, these courses have a large number of students (~100) and we make adequate use of PowerPoint presentations accompanied by explanations in the blackboard. Also, I prefer to frequently issue problem sheets for the students which I found very effective.

- Quantum computing (IPH-305)
- Preparatory courses in Physics (PH-001, PH-002)
- Modern Physics (PH-201)
- Statistical and Quantum Mechanics (PHN-006)

For degree students in Physics (First 3 years of Integrated M.Sc.)

- Computer Programming (PHN-103)
- Nuclear Physics and Its Applications (PH-308)

For masters students in Engineering (M.Tech.)

- Simulation and Computer Applications (PH-722)
- Computational Techniques in Programming (PHN-707)

For masters students in Physics (M.Sc.)

- Nuclear and Particle Physics (PH-542)
- Computational Physics (PH-511)
- Simulation and Computer Applications (PH-615)
- Nuclear Physics II (PH-662)
- Computational Nuclear Structure Physics (PHN-624)
- Advanced Nuclear Physics (PHN-607)

For graduate students in Physics (Ph.D.)

- Quantum, Statistical and Nuclear Physics (PH-786)
- Numerical Techniques and Computer Programming (PH-789)

Design of own course materials

1. Courses developed along with my colleagues:
 - a) Computational Nuclear Physics (With Dr. Rajdeep Chatterjee)
 - b) Nuclear Astrophysics (With Dr. Rajdeep Chatterjee)
 - c) Computational Physics (With Dr. Vipul Rastogi)
 - d) Computational Techniques and Programming (With Dr. Vipul Rastogi)
2. Course materials developed:
 - a) Elementary particle physics
 - b) Angular momentum theory
 - c) Computational nuclear structure
3. Extensive tutorial/problem sheets are developed for the courses I taught.

BIO-DATA

Date of birth: 31 May 1976, Nationality: Indian