

## Curriculum Vitae

Name	Gautam Gangopadhyay
Date of Birth	July 6, 1967
Official Address	Department of Physics, University of Calcutta 92 Acharya Prafulla Chandra Road, Kolkata 700 009, India
Residential Address	11/2 Kshudiram Road, Budge Budge, Kolakta 700 137
Phone:	(33) 2350 8386 Ext. 411 (Off) (33) 2470 2196 (Res)
E-mail	<a href="mailto:ggphy@caluniv.ac.in">ggphy@caluniv.ac.in</a> <a href="mailto:gautam112@yahoo.com">gautam112@yahoo.com</a>
Homepage	<a href="http://physics-caluniv.in/gautam-gangopadhyay/index.html">http://physics-caluniv.in/gautam-gangopadhyay/index.html</a>

### Academic Qualifications

Ph.D., University of Calcutta, 1997  
M.Sc. (Physics), University of Calcutta, 1990  
B.Sc. (Physics), University of Calcutta (Presidency College, Calcutta), 1988

### Positions held

Lecturer, University of Calcutta [1994-2002]  
Reader, University of Calcutta [2002-05]  
Associate Professor, University of Calcutta [2006-2010]  
Professor [2010 onwards]

### Research interest

Nuclear structure theory: Mean field theory, Resonance and bound states of halo nuclei; Nuclear astrophysics and nucleosynthesis; Experimental gamma spectroscopy

## Punblication list

### Papers in Journals:

1. Hundred years of the Saha Equation and Astrophysics, G Gangopadhyay, T be published (Invited article in Eur. Phys. J. ST),
2. Quasi- $\gamma$  band in  $^{114}\text{Te}$ : Prithwijita Ray, H. Pai, Sajad Ali, Anjali Mukherjee, A. Goswami, S. Rajbanshi, Soumik Bhattacharya, R. Banik, S. Nandi, S. Bhattacharyya, G. Mukherjee, C. Bhattacharya, S. Chakraborty, **G. Gangopadhyay**, Md. S. R. Laskar, R. Palit, G. H. Bhat, S. Jehangir, J. A. Sheikh, A. K. Sinha, S. Samanta, S. Das, S. Chatterjee, R. Raut, and S. S. Ghugre, Phys. Rev. C 101, 064313 (2020).
3. Evidence of the octupole correlation between the shears bands in  $^{142}\text{Eu}$ , Sajad Ali, S. Rajbanshi, R. Raut, H. Pai, Y.Y. Wang, **G. Gangopadhyay**, J. Meng, R. Palit, Somnath Nag, Abhijit Bisoi, S. Saha, J. Sethi, S. Bhattacharyya, S. Chattopadhyay, G. Mukherjee, A.K. Singh, T. Trivedi and A. Goswami, Physics Letters B **798**, 134960 (2019).
4. Extremely asymmetric shears band in  $^{143}\text{Sm}$ , S. Rajbanshi, R. Raut, H. Pai, Sajad Ali, A. Goswami, S. Bhattacharyya, G. Mukherjee, R. K. Bhowmik, S. Muralithar, R. P. Singh, **G. Gangopadhyay**, M. Kumar Raju, and P. Singh, Phys. Rev. C **98**, 021304(R) (2018).
5. Abrupt phase change of the core rotation in the  $^{143}\text{Sm}$  nucleus, S Rajbanshi, R Raut, H Pai, Sajad Ali, A Goswami, **G. Gangopadhyay**, S Bhattacharyya, G Mukherjee, S Muralithar, RP Singh, M Kumar Raju, P Singh and RK Bhowmik, Physics Letters B **782**, 143 (2018).
6. Evidence of antimagnetic rotation in an odd-odd nucleus: The case of  $^{142}\text{Eu}$ , Sajad Ali, S. Rajbanshi, B. Das, S. Chattopadhyay, M. Saha Sarkar, A. Goswami, R. Raut, Abhijit Bisoi, Somnath Nag, S. Saha, J. Sethi, R. Palit, **G. Gangopadhyay**, T. Bhattacharjee, S. Bhattacharyya, G. Mukherjee, A. K. Singh, and T. Trivedi, Phys. Rev. C **96**, 021304(R) (2017).
7. Microscopic folding model analysis of the radiative ( $n, \gamma$ ) reactions near the Z=28 shell closure and the weak s process, Saumi Dutta, **G. Gangopadhyay**, and Abhijit Bhattacharyya, Physical Review C **94**, 054611 (2016).
8. Shears mechanism and development of collectivity in  $^{141}\text{Sm}$ , S. Rajbanshi, Sajad Ali, Abhijit Bisoi, Somnath Nag, S. Saha, J. Sethi, T. Bhattacharjee, S. Bhattacharyya, S. Chattopadhyay, **G. Gangopadhyay**, G. Mukherjee, R. Palit, R. Raut, M. Saha Sarkar, A. K. Singh, T. Trivedi, and A. Goswami, Physical Review C **94**, 044318 (2016).
9. Neutron capture reactions relevant to the s and p processes in the region of the N=50 shell closure, Saumi Dutta, **G. Gangopadhyay** and Abhijit Bhattacharyya, Physical Review C **94**, 024604 (2016).
10. Radiative proton capture cross sections in the mass range 40-54, Dipti Chakraborty, Saumi Dutta, **G. Gangopadhyay** and Abhijit Bhattacharyya, Phys. Rev. C **94**, 015802 (2016).
11. Improvement in a phenomenological formula for ground state binding energies, **G. Gangopadhyay**, Int. J. Mod. Phys. E 25, 1650046 (2016).
12. Neutron capture reactions near N=82 shell-closure, Saumi Dutta, **G. Gangopadhyay** and Abhijit Bhattacharyya, Phys. Rev. C **93**, 024602 (2016).

13. Evidence for octupole correlation and chiral symmetry breaking in  $^{124}\text{Cs}$ , K. Selvakumar, A. K. Singh, Chandan Ghosh, Purnima Singh, A. Gowsami, R. Raut, A. Mukherjee, U. Datta, P. Dutta, S. Roy, **G. Gangopadhyay**, S. Bhowal, S. Muralithar, R. Kumar, R. P. Singh, and M. Kumar Raju, Phys. Rev. **C 92**, 064307 (2015).
14. First evidence of antimagnetic rotation in the A ~140 region, S. Rajbanshi, S. Roy, Somnath Nag, Abhijit Bisoi, S. Saha, J. Sethi, T. Trivedi, T. Bhattacharjee, S. Bhattacharyya, S. Chattopadhyay, **G. Gangopadhyay**, G. Mukherjee, R. Palit, R. Raut, M. Saha Sarkar, A. K. Singh and A. Goswami, Phys. Lett. **B 748**, 387 (2015).
15. Microscopic study of (p,gamma) reactions in the mass region A=110-125, Dipti Chakraborty, Saumi Dutta, **G. Gangopadhyay** and Abhijit Bhattacharyya, Phys. Rev. **C 91**, 057602 (2015).
16. Low energy proton capture reactions in the mass region 55-60, Saumi Dutta, Dipti Chakraborty, **G. Gangopadhyay** and Abhijit Bhattacharyya, Phys. Rev. **C 91**, 025804 (2015).
17. Multiple magnetic rotational bands due to proton alignment in  $^{143}\text{Eu}$ , S. Rajbanshi, Abhijit Bisoi, Somnath Nag, S. Saha, J. Sethi, T. Bhattacharjee, S. Bhattacharyya, S. Chattopadhyay, **G. Gangopadhyay**, G. Mukherjee, R. Palit, R. Raut, M. Saha Sarkar, A. K. Singh, T. Trivedi, and A. Goswami, Phys. Rev. **C 90**, 024318 (2014).
18. Quadrupole deformation in Lambda-hypernuclei, Bipasha Bhowmick, Abhijit Bhattacharyya, and **G. Gangopadhyay**, Eur. Phys. J. **A 50**, 125 (2014).
19. Compact stars with hyperonic cores : A case study with the IUFSU relativistic effective interaction, Bipasha Bhowmick, Madhubrata Bhattacharya, Abhijit Bhattacharyya and **G. Gangopadhyay**, Phys. Rev. **C 89**, 065806 (2014).
20. Correlation between ground state lifetime and valence nucleons for isotopic chains, V. Kumar, S. Kumar, **G. Gangopadhyay** and D. Negi, Mod. Phys. Lett. **A 29**, 1450102 (2014).
21. Shape coexistence in near spherical  $^{142}\text{Sm}$  nucleus, S. Rajbanshi, Abhijit Bisoi, Somnath Nag, S. Saha, J. Sethi, T. Trivedi, T. Bhattacharjee, S. Bhattacharyya, S. Chattopadhyay, **G. Gangopadhyay**, G. Mukherjee, R. Palit, R. Raut, M. Saha Sarkar, A. K. Singh, and A. Goswami, Phys. Rev. **C 89**, 014315 (2014).
22. Shape evolution in  $^{123}\text{Cs}$  and  $^{124}\text{Ba}$  nuclei, K. Selvakumar, A. K. Singh, Subhashri Das, Purnima Singh, Somnath Nag, A. Gowsami, R. Raut, A. Mukherjee, U. Datta Pramanik, P. Dutta, S. Roy, **G. Gangopadhyay**, S. Bhowal, S. Muralithar, R. Kumar, R. P. Singh and M. Kumar Raju, Phys. Rev. **C 88**, 024313 (2013).
23. Importance of Q-values in astrophysical rapid proton process, Chirashree Lahiri and **G. Gangopadhyay**, Mod. Phys. Lett. **A 28**, 1350076 (2013).
24. Strange baryons, nuclear dripline and shrinkage : A Relativistic Mean Field study, Bipasha Bhowmick, Abhijit Bhattacharyya and **G. Gangopadhyay**, Int. J. Mod. Phys. **E 22**, 1350012 (2013).
25. Low energy proton reactions of astrophysical interest in A. ~ 90 - 100 region, C. Lahiri and G. Gangopadhyay, Phys. Rev. **C 86**, 047601 (2012).
26. Endpoint of rp-process using relativistic mean field approach and a new mass formula, Chirashree Lahiri and **G. Gangopadhyay**, Int. J. Mod. Phys. **E 21**, 1250074 (2012).
27. Ground states and excited states of hypernuclei in relativistic mean field approach, Bipasha Bhowmick, Abhijit Bhattacharyya and **G. Gangopadhyay**, Int. J. Mod. Phys. **E 21**, 1250069 (2012).
28. Neutron rich nuclei in a new binding energy formula and the astrophysical r-process, Chirashree Lahiri and **G. Gangopadhyay**, Int. J. Mod. Phys. **E 21**, 1250042 (2012).

29. Helium nuclei around the neutron drip line, Madhubrata Bhattacharya, G. Gangopadhyay and Subinit Roy, Phys. Rev. C **85**, 034312 (2012).
30. Relativistic mean field in A ~80 nuclei and low energy proton reactions, Chirashree Lahiri and **G. Gangopadhyay**, Phys. Rev. C **84**, 057601 (2011).
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32. Development of collective structures over noncollective excitations in  $^{139}\text{Nd}$ , S. Bhowal, **G. Gangopadhyay**, C. M. Petrache, I. Ragnarsson, A. K. Singh, S. Bhattacharya, H. Hubel, A. Neusser-Neffgen, A. Al-Khatib, P. Bringel, A. Burger, N. Neno., G. Schonwasser, G. B. Hagemann, B. Herskind, D. R. Jensen, G. Sletten, P. Fallon, A. Gorgen, P. Bednarczyk, D. Curien, A. Korichi, A. Lopez-Martens, B. V. T. Rao, T. S. Reddy and Nirmal Singh, Phys. Rev. C **84**, 024313 (2011).
33. Microscopic calculation of proton capture reactions in the mass 60-80 region and its astrophysical implications C. Lahiri and **G. Gangopadhyay**, Eur. Phys. J. A **47**, 87 (2011).
34. Stability against decay of some recently observed superheavy elements, Partha Roy Chowdhury, **G. Gangopadhyay** and Abhijit Bhattacharyya, Phys. Rev. C **83**, 027601 (2011).
35. Energy levels in  $^{141}\text{Nd}$  from fusion evaporation study, Samit Bhowal, Chirashree Lahiri, Rajarshi Raut, Purnima Singh, M. Kumar Raju, A. Goswami, A.K. Singh, S. Bhattacharya, T. Bhattacharjee, G. Mukherjee, S. Bhattacharyya, S. Muralithar, R.K. Bhowmik, N. Madhavan, R.P.Singh and **G. Gangopadhyay**, J. Phys. G: Part. Nucl. Phys. **38**, 035105 (2011).
36. A new phenomenological formula for ground state-binding energies, **G. Gangopadhyay**, Int. J. Mod. Phys. E **20**, 179 (2011).
37. Low energy (p, gamma) reactions in Ni and Cu nuclei using a microscopic optical model, **G. Gangopadhyay**, Phys. Rev. C **82** 027603 (2010).
38. Valence particles and the correction to relativistic mean field binding energy, **G. Gangopadhyay**, J. Phys. G : Part. Nucl. Phys. **37**, 015108 (2010)
39. Simple parametrization of an alpha-decay spectroscopic factor in  $150 \leq A \leq 200$  region, **G. Gangopadhyay**, J. Phys. G: Part. Nucl. Phys. **36**, 095105 (2009).
40. Correction to relativistic mean field binding energy and  $N_pN_n$  scheme, Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Lett. B **672**, 182 (2009).
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42. Alpha-decay lifetime in superheavy nuclei With  $A > 282$ , Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Rev. C **77**, 047302 (2008).
43. Cluster decay in very heavy nuclei in a relativistic mean field model, Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Rev. C **77**, 027603 (2008).
44. Continuum states in neutron rich Calcium and Nickel nuclei, Madhubrata Bhattacharya and **G. Gangopadhyay**, Fizika B **16**, 113 (2007).
45. Study of yrast band in  $^{155}\text{Tm}$ , R.Raut, S.Bhowal, S.Ganguly, R.Kshetri, P.Banerjee, S.Bhattacharya, R.K.Bhowmik, B.Dasmahapatra, **G.Gangopadhyay**, A.Mukherjee, S.Muralithar, M.SahaSarkar, R.P.Singh and A. Goswami,Nucl. Phys. A **A791**, 1 (2007).
46. Microscopic calculation of half lives of spherical proton emitters, Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Lett. B **651**, 263 (2007).
47. Role of pairing interaction in neutron rich odd and even Zr nuclei, Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Rev. C **75**, 017301 (2007).

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53. Neutron drip line in odd and even mass calcium and nickel Nuclei, Madhubrata Bhattacharya and **G. Gangopadhyay**, Phys. Rev. **C 72**, 044318 (2005).
54. Relativistic mean field study of neutron rich even-even C and Be isotopes, **G. Gangopadhyay** and Subinit Roy, J. Phys. G: Part. Nucl. Phys. **31**, 1111 (2005).
55. Levels in doubly odd  $^{138}\text{Pr}$ , **G. Gangopadhyay**, Samit Bhowal, R.K. Bhowmik, U. Datta Pramanik, P. Ghosh, A. Goswami, C. Petrache, A. Mukherjee, S. Muralithar, Rajarshi Raut, M. Saha Sarkar, A.K. Singh, R.P. Singh and S. Bhattacharya, Eur. Phys. J. **A 24**, 173 (2005).
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60. Relativistic mean field calculation for odd mass nuclei in  $A \sim 60$ -70 region, Parna Mitra and **G. Gangopadhyay**, Phys. Rev. **C 68**, 044319 (2003).
61. Relativistic description of nuclear matter in Hartree Fock approximation using generalized hybrid derivative coupling, Parna Mitra, **G. Gangopadhyay** and B. Malakar, Int. J. Mod. Phys. **E 12**, 699 (2003).
62. Deformation constrained calculation for light nuclei in generalized hybrid derivative coupling model, Parna Mitra, **G. Gangopadhyay** and B. Malakar, Phys. Rev. **C 65**, 034329 (2002).
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66. Relativistic mean field description of Zn and Ge nuclei, **G. Gangopadhyay**, Phys. Rev. **C 59**, 2541 (1999).
67. Level structure of odd-odd  $^{62}\text{Cu}$  isotope, A.K. Singh, **G. Gangopadhyay**, D. Banerjee, R. Bhattacharya, R.K. Bhowmik, S. Murlithar, R.P. Singh, A. Mukherjee, U. Datta Pramanik, A. Goswami, S. Chattopadhyay, S. Bhattacharya, B. Dasmahapatra and S. Sen, Phys. Rev. **C 59**, 2440 (1999).
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71. Configuration mixing calculation in the framework of IBM-2 in even  $^{112-118}\text{Sn}$  isotopes, A.K. Singh, **G. Gangopadhyay** and D. Banerjee, Phys. Rev. **C 55**, 968 (1997).
72. Structure of odd-odd Cu isotopes in the framework of interacting boson fermion model, A.K. Singh and **G. Gangopadhyay**, Phys. Rev. C 55, 726 (1997).
73. High spin structures in  $^{112}\text{Sb}$ , A.K. Singh, **G. Gangopadhyay**, D. Banerjee, R. Bhattacharya, R.K. Bhowmik, S. Murlithar, G. Rodrigues, R.P. Singh, A. Goswami, S. Chattopadhyay, S. Bhattacharya, B. Dasmahapatra and S. Sen, Nucl. Phys. **A607**, 350 (1996).
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75. Rotational band in  $^{111}\text{Sn}$ , **G. Gangopadhyay**, A.K. Singh, D. Banerjee, R. Bhattacharya, R.K. Bhowmik, S. Murlithar, G. Rodrigues, R.P. Singh, A. Goswami, S. Bhattacharya, B. Dasmahapatra and S. Sen, Zeit. Phys. **A351**, 1 (1995).
76. Magnetic moment in the framework of U(6/10) supersymmetry, **G. Gangopadhyay**, J. Phys. G: Part. Nucl. Phys. **20**, 1997 (1994).
77. Microscopic investigation of nuclear structure with dynamic Bose-Fermi symmetry, **G. Gangopadhyay** and D. Banerjee, Phys. Rev. **C 50**, 1383 (1994).

78. Evidence of U(12/10) supersymmetry in the 1f2p shell, **G. Gangopadhyay** and D. Banerjee, J. Phys. G: Part. Nucl. Phys. 20, 1217 (1994).
79. Pulse height spectrum from a photomultiplier tube under direct gamma ray illumination, **G. Gangopadhyay**, D. Banerjee and R. Bhattacharya, Nucl. Instr. and Meth. **A336**, 186 (1993)
80. U(6/10) supersymmetry in the Ni isotopes, **G. Gangopadhyay** and D. Banerjee, J. Phys. G: Part. Nucl. Phys. **19**, 1879 (1993).

### **Peer-reviewed Papers in Conference Proceedings**

1. Relativistic Mean Field Calculations in Neutron-rich Nuclei, **G. Gangopadhyay**, Madhubrata Bhattacharya and Subinit Roy, Frontiers in Gamma-Ray Spectroscopy 2012 - FIG12, AIP Conf. Proc. **1609**, 63-70 (20140).

### **Documents related to India-based Neutrino Observatory**

1. Physics Potential of the ICAL detector at the India-based Neutrino Observatory (INO), The ICAL Collaboration, Pramana - J. Phys 88 : 79 (2017).

### **Edited Volume:**

2. CU Physics 100, Published on the occasion of the Centenary Celebrations of the Department of Physics, University of Calcutta, 2016, Co-editor Anirban Kundu, Published by University of Calcutta

### **Fellowship, Honours, etc**

Former Regular Associate of the Abdus Salam International Centre for Theoretical Physics. Trieste, Italy (2009-2016)

Hony Secretary, Indian Physical Society (2013 - )

Hony Secretary, Bangiya Bijnan Parishad (2019 - )

### **Projects (Completed)**

1. Co-ordinator, UGC-DRS II Programme on 'Theoretical Nuclear Particle and Astrophysics', Dept. of Physics, University of Calcutta (2015-20).
2. Principal Investigator (CU), DST Project entitled 'R & D Efforts by University Groups for INO Project' (2013-18).
3. Principal Investigator, DST Project entitled 'RPC development and testing, and simulation studies for the INO-ICAL detector' (2010-13 ).
4. Principal Investigator (CU), DST Project entitled 'Pre-Operative Programme for Indian Participation in the FAIR Project at GSI, Darmstadt, Germany, Accelerator and Detector-Related R & D and Prototyping' (2009-14 )
5. Co-ordinator, UGC-DRS Programme on 'Theoretical Nuclear Particle and Astrophysics', Dept. of Physics, University of Calcutta (2009-14 ).

6. Principal Investigator, DAE-BRNS Project entitled 'Relativistic calculation in dripline nuclei and test of the densities through the study of scattering' (2005-2009).
7. Principal Investigator, AUC-DAE Project entitled 'Spectroscopy of heavy nuclei transfer products' (2005-2008).
8. Principal Investigator, Minor Research Project under the UGC entitled 'Investigation of application of the exchange terms in hybrid derivative coupling relativistic mean field in nuclear matter and finite nuclei' (2002-2004).

## **Collaborations**

1. Compressed Baryonic Matter (CBM) at FAIR
2. India-based Neutrino Observatory

## **Recent lectures and invited talks**

1. Saha Equation and Hundred Years of Astrophysics, Webinar delivered at Department of Physics, IIT-BHU, Sept 24, 2020.
2. An online course on Nuclear Physics at the 11-week Course-“Learning Physics with Conceptual and Problem based Approach” organized by National Academy of Sciences India, Delhi Chapter, National Academy of Sciences
3. Nuclear inputs in astrophysical s-process nucleosynthesis, Plenary talk in 44<sup>th</sup> DAE-BRNS Symposium on Nuclear Physics”, Lucknow University, Lucknow December 23-27, 2019
4. A Scientist’s Journey to the Stars, Lecture delivered in the outreach programme of the Conference Saha Equation 100, University of Calcutta on September 25, 2019
5. Nuclear Astrophysics, Lectures delivered in the IUAC School on Nuclear Reactions, Inter University Accelerator Centre, New Delhi on July 18-20, 2019
6. Introduction to Nucleosynthesis (II), Lectures delivered in SERB School on Nuclear Astrophysics, February 22, 2019
7. Physics Research of Meghnad Saha, Talk delivered in Presidency University on March 7, 2019
8. Saha and his equation: A century later, Lecture delivered in SERB School on Nuclear Astrophysics, February 2019 and in Guru Ghasidas Central University, Bilaspur on February 28, 2019
9. Nuclear Reactions in Medium and Heavy Nuclei, Lectures delivered in the CNT Lectures on Special topics in Nuclear Astrophysics, March 1-11, 2017, VECC, Kolkata
10. Theoretical Nuclear Astrophysics, Lectures delivered in the SERC School on Nuclear Physics, Nuclear physics from New Perspectives at Bharathiar University, Feb 7-27, 2017
11. Nucleosynthesis: Importance of nuclear physics inputs, Talk in Presidency University, February 24, 2016

12. Radiative capture in medium mass region: Astrophysical importance, Talk in 'Recent Trends in Nuclear Structure and its Implication to Nuclear Astrophysics, IOP & TIFR, January 4-8 2016,Puri

### **Ph.D. Guidance**

1. Dr. Parna Mitra (2006)
2. Dr. Madhubrata Bhattacharya (2010)
3. Dr. Shamit Bhowal (2012)
4. Dr. Chirashree Lahiri (2015)
5. Dr. Bipasha Bhowmick (2016)
6. Saumi Dutta (2019)
7. Deepti Chakraborty
8. Sameena Murtaza
9. Soumya Saha

### **Post-doctoral mentoring**

1. Dr. Madhubrata Bhattacharya
2. Dr. Sabyasachi Ghosh
3. Dr. Purba Bhattacharya