

## CURRICULUM VITAE

1. NAME: ABHIJIT BHATTACHARYYA
2. PRESENT DESIGNATION: PROFESSOR
3. ADDRESS : DEPARTMENT OF PHYSICS  
UNIVERSITY OF CALCUTTA  
92 A.P.C. ROAD  
KOLKATA 700 009  
INDIA
- E-MAIL ADDRESS: abhattacharyyacu@gmail.com  
abphy@caluniv.ac.in
- TELEPHONE : +91-9831353084  
+91-7003832286

4. RESEARCH INTERESTS :

QCD at high temperature and density, Ultrarelativistic Heavy Ion Collisions,  
Phase transitions in neutron stars

5. EDUCATION :

1. **Ph.D. in Physics**, Bose Institute (Degree awarded by Jadavpur University), Kolkata, India; (2<sup>nd</sup> November 1992 to 28<sup>th</sup> February 1998).

*Title of the thesis* : FINITE TEMPERATURE FIELD THEORY AND ITS PHENOMENOLOGICAL APPLICATION

2. **M. Sc. in Physics**, 1992, Indian Institute of Technology, Kanpur, India.
3. **B. Sc.** (Hons. in Physics), 1990, Presidency College, Kolkata, India.

6. AWARDS AND HONOURS:

1. **Alexander von Humboldt Research Fellowship.**
2. **K.S.Krishnan award for support towards doctoral research.**

## 7. PUBLICATIONS

1. **"Interpreting correlated observations of cosmic rays and gamma-rays from Centaurus A with a proton blazar inspired model"**, Prabir Banik, Arunava Bhadra and **Abhijit Bhattacharyya**; *Mon. Not. Roy. Astron. Soc.* 500 1087 (2021).
2. **"Interacting hadron resonance gas model in magnetic field and the fluctuations of conserved charges"**, Guruprasad Kadam, Somenath Pal and **Abhijit Bhattacharyya**; *Journal of Physics G* 47 125106 (2020).
3. **"Finite temperature properties of a modified Polyakov-Nambu-Jona-Lasinio model"**, **Abhijit Bhattacharyya**, Kinkar Saha, Paramita Deb, Sanjay K. Ghosh, Soumitra Maity, Sibaji Raha, Rajarshi Ray, and Sudipa Upadhaya; *Physical Review D* 102 074006 (2020).
4. **"Dispersion and suppression of sound near QCD critical point"**, Md Hasanujjaman, Mahfuzur Rahaman, **Abhijit Bhattacharyya** and Jan-e Alam; *Physical Review C* 102 034910 (2020).
5. **"Suppression of quarkonia in PbPb collisions at  $\sqrt{s} = 5.02$  TeV"**, Vineet Kumar, Prashant Shukla and **Abhijit Bhattacharyya**; *Journal of Physics G* 47 015104 (2020).
6. **"Effects of a non-zero strangeness-chemical potential in strong interaction models"**, Ayon Mukherjee, **Abhijit Bhattacharyya** and Stefan Schramm; *Physics Letters B* 797 134899 (2019).
7. **"Fluctuation of conserved charges, a signature of QCD phase transition : A review"**, **Abhijit Bhattacharyya**; *AAPPS Bulletin* 29 9 (2019).
8. **"Thermodynamics of strongly interacting matter in a hybrid model"**, **Abhijit Bhattacharyya**, Sanjay K. Ghosh, Soumitra Maity, Sibaji Raha, Rajarshi Ray, Kinkar Saha, Subhasis Samanta and Sudipa Upadhaya; *Physical Review C* 99 045207 (2019).
9. **" $\Psi(2s)$  production in  $p+A$  collisions"**, Partha Pratim Bhaduri and **Abhijit Bhattacharyya**; *Europhysics Letters* 124 22001 (2018).
10. **"Reparametrizing the Polyakov–Nambu–Jona-Lasinio model"**, **Abhijit Bhattacharyya**, Sanjay K. Ghosh, Soumitra Maity, Sibaji Raha, Rajarshi Ray, Kinkar Saha and Sudipa Upadhaya; *Physical Review D* 95 054005 (2017).

11. **"Challenges in QCD matter physics - The scientific programme of the Compressed Baryonic Matter experiment at FAIR"**, T. Ablyazimov *et. al.*; *European Physical Journal A* 53 60 (2017).
12. **"Polyakov–Nambu–Jona-Lasinio model in a finite volume"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, Rajarshi Ray, Kinkar Saha and Sudipa Upadhyaya; *Europhysics Letters* 116 52001 (2016).
13. **"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).
14. **"Exploring effects of magnetic field on the Hadron Resonance Gas"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, Rajarshi Ray and Subhasis Samanta; *Europhysics Letters* 115 62003 (2016).
15. **"Neutron capture reactions relevant to s-process and p-process in the domain of the  $N = 50$  shell closure"**, Saumi Dutta, G. Gangopadhyay and Abhijit Bhattacharyya; *Physical Review C* 94 024604 (2016).
16. **"Radiative proton capture cross sections in the mass range 40-54"**, Dipti Chakraborty, Saumi Dutta, G. Gangopadhyay and Abhijit Bhattacharyya; *Physical Review C* 94 015802 (2016).
17. **"Neutron capture reactions near the  $N = 82$  shell-closure"**, Saumi Dutta, Dipti Chakraborty, G. Gangopadhyay and Abhijit Bhattacharyya; *Physical Review C* 93 024602 (2016).
18. **"Microscopic Study of  $(p, \gamma)$  Reactions in Mass Region  $A=110-125$ "**, Dipti Chakraborty, Saumi Dutta, G. Gangopadhyay and Abhijit Bhattacharyya; *Physical Review C* 91 057602 (2015).
19. **"On the possibility of  $\rho$ -meson condensation in neutron stars"**, Ritam Mallick, Stefan Schramm, Veronica Dexheimer and Abhijit Bhattacharyya; *Mon. Not. Roy. Astron. Soc.* 449 1347 (2015).
20. **"Thermodynamics and fuctuations of conserved charges in Hadron Resonance Gas model in finite volume"**, Abhijit Bhattacharyya, Rajarshi Ray, Subhasis Samanta and Subrata Sur; *Physical Review C Rapid Communication* 91 041901 (R) (2015).

21. **"Fluctuations of strongly interacting matter in Polyakov-Nambu-Jona-Lasinio model in a finite volume"**, Abhijit Bhattacharyya, Rajarshi Ray and Subrata Sur; *Physical Review D Rapid Communication* 91 051501 (R) (2015).
22. **"Low Energy Proton Capture Reactions in the Mass Region 55-60"**, Saumi Dutta, Dipti Chakraborty, G. Gangopadhyay and Abhijit Bhattacharyya; *Physical Review C* 91 025805 (2015).
23. **"Fluctuations and correlations of conserved charges in an excluded-volume hadron resonance gas model"**, Abhijit Bhattacharyya, Supriya Das, Sanjay K. Ghosh, Rajarshi Ray and Subhasis Samanta; *Physical Review C* 90 034909 (2014).
24. **"Quadrupole deformation in  $\Lambda$ -hypernuclei"**, Bipasha Bhowmick, Abhijit Bhattacharyya and G. Gangopadhyay; *European Physical Journal A* 50 125 (2014).
25. **"Massive neutron stars with hyperonic core : a case study with the IUFSU relativistic effective interaction"**, Bipasha Bhowmick, Madhubrata Bhattacharya, Abhijit Bhattacharyya and G. Gangopadhyay; *Physical Review C* 89 0645806 (2014).
26. **"Isospin symmetry breaking and baryon-isospin correlations from Polyakov– Nambu–Jona-Lasinio model"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, Anirban Lahiri, Sarbani Majumder, Sibaji Raha and Rajarshi Ray; *Physical Review C* 89 064905 (2014).
27. **"Thermodynamic properties of strongly interacting matter in a finite volume using the Polyakov-Nambu-Jona-Lasinio model"**, Abhijit Bhattacharyya, Paramita Deb, Sanjay K. Ghosh, Rajarshi Ray and Subrata Sur; *Physical Review D* 87 054009 (2013).
28. **"General relativistic effect on the energy deposition rate for neutrino pair annihilation above the equatorial plane along the symmetry axis near a rotating neutron star"**, Ritam Mallick, Abhijit Bhattacharyya, Sanjay K. Ghosh and Sibaji Raha; *International Journal of Modern Physics E* 23 1350008 (2013).
29. **"Strange baryons, nuclear dripline and shrinkage: A relativistic mean field study"**, Bipasha Bhowmick, Abhijit Bhattacharyya and G. Gangopadhyay; *International Journal of Modern Physics E* 23 1350012 (2013).

30. "Study of beta equilibrated 2+1 flavor quark matter in the Polyakov-Nambu-Jona-Lasinio model", Abhijit Bhattacharyya, Sanjay K. Ghosh, Sarbani Majumder and Rajarshi Ray; *Physical Review D* **86** 096006 (2012).
31. "Ground states and excited states of hypernuclei in relativistic mean field approach", Bipasha Bhowmick, Abhijit Bhattacharyya and G. Gangopadhyay; *International Journal of Modern Physics E* **21** 1250069 (2012).
32. "QCD phase diagram using PNJL model with eight-quark interactions" Paramita Deb, Abhijit Bhattacharyya, Sanjay K. Ghosh, Rajarshi Ray and Anirban Lahiri; *Nuclear Physics A* **862-863** 267 (2011).
33. "Stability against  $\alpha$  decay of some recently observed superheavy elements" Partha Roy Chowdhury, G. Gangopadhyay and Abhijit Bhattacharyya, *Physical Review C* **83** 027601 (2011).
34. "Correlation between conserved charges in PNJL Model with multi-quark interactions" Abhijit Bhattacharyya, Paramita Deb, Anirban Lahiri and Rajarshi Ray, *Physical Review D* **83** 014011 (2011).
35. "Susceptibilities with multi-quark interactions in the Polyakov-Nambu-Jona-Lasinio model" Abhijit Bhattacharyya, Paramita Deb, Anirban Lahiri and Rajarshi Ray, *Physical Review D* **82** 114028 (2010).
36. "Investigation of Phase Diagram and Bulk Thermodynamic Properties using PNJL Model with Eight-Quark Interactions" Abhijit Bhattacharyya, Paramita Deb, Sanjay K. Ghosh and Rajarshi Ray, *Physical Review D* **82** 014021 (2010).
37. "Isospin asymmetric nuclear matter and properties of axisymmetric neutron stars" Partha Roy Chowdhury, Abhijit Bhattacharyya and D.N. Basu, *Physical Review C Rapid Communication* **81** 062801 (R) (2010).
38. "Deconfinement Phase Transition in Compact Stars : Maxwell vs. Gibbs Construction", Abhijit Bhattacharyya, Igor N. Mishustin and Walter Greiner; *Journal of Physics G* **37** 025201 (2010).
39. "Mesonic Excitations in QGP - Study with an effective model" Paramita Deb, Abhijit Bhattacharyya, Saumen Datta and Sanjay K. Ghosh; *Physical Review C* **79** 055208 (2009).
40. "General relativistic effects on the conversion of nuclear to two-flavor quark matter in compact stars" Abhijit Bhattacharyya, Sanjay K. Ghosh,

- Ritam Mallick and Sibaji Raha; *Physical Review C Rapid Communication* **76** 052801 (R) (2007).
41. **"Rotating Quark Star in Chiral Colour Dielectric Model"** Abhijit Bhattacharyya and Sanjay K. Ghosh; *Modern Physics Letters A* **22** 1019 (2007).
  42. **"Consequences of quark hadron phase transition in dense stars"**, Abhijit Bhattacharyya, Sanjay K. Ghosh and Sibaji Raha; *Journal of Physics Conference Series* **50** 418 (2006).
  43. **"The conversion of Neutron star to Strange star: A two step process"** Abhijit Bhattacharyya, Sanjay K. Ghosh, Partha Joarder, Ritam Mallick and Sibaji Raha; *Physical Review C* **74** 065804 (2006).
  44. **"Colour entangled orphan quarks and dark energy from cosmic QCD phase transition"** Shibaji Banerjee, Abhijit Bhattacharyya, Sanjay K. Ghosh, Ernest-Michael Ilgenfritz, Sibaji Raha, Bikash Sinha, Erichi Takasugi and Hiroshi Toki; *Nuclear Physics A* **774** 769 (2006).
  45. **"QCD phase transition in rotating neutron star, neutrino beaming and gamma-ray bursters"**, Abhijit Bhattacharyya, Sanjay K. Ghosh and Sibaji Raha; *Physics Letters B* **635** 195 (2006).
  46. **"Strangeness, Cosmological Cold Dark Matter And Dark Energy"**, Sibaji Raha, Shibaji Banerjee, Abhijit Bhattacharyya, Sanjay K. Ghosh, Ernest-Michael Ilgenfritz, Bikash Sinha, Erichi Takasugi and Hiroshi Toki; *Journal of Physics G* **31** S857 (2005).
  47. **"Rotating twin stars and signature of quark hadron phase transition"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, Matthias Hanauske and Sibaji Raha; *Physical Review C* **71** 048801 (2005).
  48. **"Cosmological dark energy from the cosmic QCD phase transition and colour entanglement"**, Shibaji Banerjee, Abhijit Bhattacharyya, Sanjay K. Ghosh, Ernest-Michael Ilgenfritz, Sibaji Raha, Bikash Sinha, Erichi Takasugi and Hiroshi Toki; *Physics Letters B* **611** 27 (2005).
  49. **"Catastrophic rearrangement of a compact star due to the quark core formation"**, I.N. Mishustin, M. Hanauske, Abhijit Bhattacharyya, L.M. Satarov, H. Stoecker and W. Greiner; *Physics Letters B* **552** 1 (2003).
  50. **"Massive Compact Halo Objects from the relics of the Cosmic Quark-Hadron Phase Transition"**, Shibaji Banerjee, Abhijit Bhattacharyya,

Sanjay K. Ghosh, Sibaji Raha, Bikash Sinha and Hiroshi Toki; *Mon. Not. Roy. Astron. Soc.* 340 284 (2003).

51. "Some aspects of strangeness in astrophysics and cosmology", Shibaji Banerjee, **Abhijit Bhattacharyya**, Sanjay K. Ghosh, Sibaji Raha, Bikash Sinha and Hiroshi Toki; *Nuclear Physics A* 721 102 (2003).
52. "Relics of Cosmic Quark-Hadron Phase Transition and Massive Compact Halo Objects", Shibaji Banerjee, **Abhijit Bhattacharyya**, Sanjay K. Ghosh, Sibaji Raha, Bikash Sinha and Hiroshi Toki; *Nuclear Physics A* 715 827 (2003).
53. "QCD phase transition in the early universe and Quark Nuggets", **Abhijit Bhattacharyya**, Shibaji Banerjee, Sanjay K. Ghosh, Sibaji Raha, Bikash Sinha and Hiroshi Toki; *Pramana* 60, 909 (2002).
54. "Bose-Einstein condensation in dense nuclear matter and strong magnetic fields", Prantick Dey, **Abhijit Bhattacharyya** and Debades Bandyopadhyay; *Journal of Physics G* 28 2179 (2002).
55. "Relics of cosmological QCD phase transition", **Abhijit Bhattacharyya**, Jan-e Alam, Sourav Sarkar, Bikash Sinha, Sibaji Raha and Pijushpani Bhattacharyya; *Physical Review D* 61 083509 (2000).
56. "Cosmological Quark-Hadron phase transition and dark matter", **Abhijit Bhattacharyya**, Jan-e Alam, Sourav Sarkar, Bikash Sinha, Sibaji Raha and Pijushpani Bhattacharyya; *Nuclear Physics A* 661 629 (1999).
57. "Effects of in-medium meson masses on nuclear matter properties", **Abhijit Bhattacharyya**, Sanjay K. Ghosh and S. C. Phatak; *Physical Review C* 60 044903 (1999).
58. " $\rho$  mass modification in  $He^3$ : A signal for restoration of chiral symmetry or test for nuclear matter models?", **Abhijit Bhattacharyya**, Sanjay K. Ghosh and Sibaji Raha; *Physical Review C* 60 018202 (1999).
59. "Dissociation of pions and kaons in hot medium", **Abhijit Bhattacharyya**, Sanjay K. Ghosh and Sibaji Raha; *Modern Physics Letters A* 14 621 (1999).
60. " $\rho$ - $\omega$  mixing at high temperature and density", **Abhijit Bhattacharyya**; *Modern Physics Letters A* 13 2585 (1998).
61. "Model study of hot and dense baryonic matter", **Abhijit Bhattacharyya** and Sanjay K. Ghosh; *International Journal of Modern Physics E* 7 495 (1998).

62. **"Variation of  $\gamma$ -ray and particle fluxes at the sea level during the total solar eclipse of 24 October 1995"**, Abhijit Bhattacharyya, Sukumar Biswas, Barun K. Chatterjee, Mala Das, Pradipta Das, Tapan Das, Tarun Dey, Rabi Mukherjee, Sibaji Raha, Suprakash C. Roy, Swapan K. Saha, Arun K. Sen, Bikash Sinha and Debopriyo Syam; *Astrophysics and Space Sciences* 250 313 (1997).
63. **"Finite temperature effects on electromagnetic probes of Quark Gluon Plasma"**, Abhijit Bhattacharyya, Jan-e Alam, Sibaji Raha and Bikash Sinha; *International Journal of Modern Physics A* 12 5639 (1997).
64. **"Kaon mass in dense matter"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, S. C. Phatak and Sibaji Raha; *Physics Letters B* 401 213 (1997).
65. **"In medium effects on  $\phi$  meson"**, Abhijit Bhattacharyya, Sanjay K. Ghosh, S. C. Phatak and Sibaji Raha; *Physical Review C* 55 1463 (1997).
66. **" $\sigma$  and  $\omega$ , with  $\Delta$  baryon, at high temperature"**, Abhijit Bhattacharyya; *International Journal of Modern Physics E* 5 511 (1996).
67. **"Hadron masses at finite density from the Zimanyi - Moskowski model"**, Abhijit Bhattacharyya and Sibaji Raha; *Physical Review C* 53 522 (1996).
68. **"Temperature dependence of pi, K and eta meson masses"**, Abhijit Bhattacharyya and Sibaji Raha; *Physics Letters B* 363 162 (1995).
69. **"Temperature dependence of hadron masses 1: Results from an extended linear sigma model"**, Abhijit Bhattacharyya and Sibaji Raha; *Journal of Physics G* 21 741 (1995).
70. **"Tunneling in magnetic fields"**, Abhijit Bhattacharyya and Sayan Kar; *International Journal of Theoretical Physics* 34 63 (1995).