

# National Institute of Technology, Tiruchirappalli: Performa for CV of Faculty/ Staff Members

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## Curriculum Vitae



Brief Profile: 1-2 paragraphs (not exceeding 500 words)

I was born on January 27, 1990 at Kolkata, West Bengal, India. From my very childhood I am interested in Astrophysics and Cosmology in general. My research work focusses on the physical properties of superdense exotic matter in the interiors of white dwarfs and neutron stars (known as compact stars in general). Neutron stars and white dwarfs are home to matter at extreme astrophysical conditions – extreme density, extreme gravity and extreme electromagnetic fields as compared to terrestrial matter. The typical densities vary from  $10^8 - 10^{15}$  gm/cm<sup>3</sup>, the acceleration due to gravity is  $\sim 10^{10}$  times that of the value at the surface of the Earth and the typical magnetic field strengths  $\sim 10^{15}$  gauss. Hence the physical properties of these extreme and exotic states of matter inside compact stars are one of the most challenging and exciting fields of study in theoretical astrophysics. These studies not only provide us the nature of matter at these scales but also throw light on fundamental physics as well. Now with the advent of LIGO, KAGRA, LISA and many other gravitational wave observatories, along with the other existing telescopes operating at various wavelengths in the electromagnetic spectrum, we are able to probe the interior structures and various phases of matter inside compact stars which not only have revolutionized this field of research but also have made it even more interesting.

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2. Designation: Assistant Professor
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5. Email (Primary): somnath@nitt.edu                      Email (Secondary): smpapan7@gmail.com
6. Field(s) of Specialization:  
Theoretical Nuclear Astrophysics, Compact Stars,  
Gravitational Waves

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### 7. Employment Profile

Job Title	Employer	From	To
1. Assistant Professor	NIT Tiruchirappalli	22.06.2020	Till Date
2. Research Associate	Dept. of Atomic Energy, Board of Research in Nuclear Sciences, Govt. of India.	15.02.2019	04.06.2020

### 8. Academic Qualifications (From Highest Degree to High School):

Examination	Board / University	Year	Division/ Grade	Subjects
Ph.D.	Variable Energy Cyclotron Centre, Kolkata and Homi Bhabha National Institute, Mumbai	2019		Equations of States for White Dwarfs and Neutron Stars
M.Sc.	S. N. Bose National Centre for Basic Sciences, University of Calcutta, Kolkata	2013	72.1%	Physics
B.Sc. (Honours)	Scottish Church College, University of Calcutta, Kolkata	2011	63%	Physics (Hons.)

### 9. Academic/Administrative Responsibilities within the University

Position	Faculty /Department /Centre/Institution	From	To
1. Member of Antiragging committee	Institution	26.02.2021	Till Date
2. Performance Analysis Committee Chairman and Class Coordinator of M.Tech. 1 <sup>st</sup> year	Department	22.06.2020	Till Date

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3. Faculty Advisor of Space and Astronomy Club - Nakshatra	Institution	28.07.2021	Till Date
4. Member of Syllabus revision committee for M.Tech. NDT	Department	04.11.2020	Till Date
5. Member of Departmental Library Committee	Department	23.06.2022	Till Date

10. Academic/Administrative Responsibilities outside the University

Position	Institution	From	To

11. Awards, Associateships etc.

Year of Award	Name of the Award	Awarding Organization
1. 2009	National Graduate Physics Examination (NGPE) Rank Holder	Indian Association of Physics Teachers, Kanpur.

12. Fellowships

Year of Award	Name of the Fellowship	Awarding Organization	From (Month/Year)	To (Month/Year)

13. Details of Academic Work

(i) Curriculum Development

(ii) Courses taught at Postgraduate and Undergraduate levels:

UG (B.Tech.) 1<sup>st</sup> year – Physics Theory (PHIR11)

UG (B.Tech.) 1<sup>st</sup> year – Physics Lab (PHIR12)

PG (M.Tech.) Nondestructive Testing 1<sup>st</sup> year – Surface NDE Techniques (PH601)

PG (M.Sc.) Physics 1<sup>st</sup> year – Statistical Mechanics (PH656)

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(iii) Projects guided at Postgraduate level:

<b>Roll Number</b>	<b>Name</b>	<b>Title of Thesis</b>	<b>Year</b>
213219015	Rishabh Kumar	Mass-Radius Relation of White Dwarfs at Finite Temperature	2021
213219018	Tambe Pranjal Anant	Equation of State of Magnetized White Dwarfs at Finite Temperatures	2021
213220008	Harihara Biswanath	Effects of Fermionic Mass and Interaction Strength on the Equation of State of Non-Interacting and Strongly Interacting Fermi Gas	2022
213220025	Zenia Zuraig	Effects of Fermion Mass and Strong Two-Body Interactions on The Mass-Radius Relationship of Non-Rotating Fermionic Compact Stars	2022
213120018	Saiprakash C P	Effect of Fiber Layer Orientation on Thermal Diffusivity in Composites	2021
213120018	Saiprakash C P	Determination of Defect Position in Composite Material using Flash Thermography	2022

(iv) Other contribution(s)

14. Details of Major R&D Projects

Title of Project	Funding Agency	Duration		Status
		From	To	Ongoing/ Completed

15. Number of PhDs guided

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Name of the PhD Scholar	Title of PhD Thesis	Role(Supervisor/ Co-Supervisor)	Year of Award

16. Participation in Workshops/ Symposia/ Conferences/ Colloquia /Seminars/ Schools etc. (mentioning the role)

Date (s)	Title of Activity	Level of Event (International/ National/ Local)	Role (Participant/ Speaker/ Chairperson, Paper presenter, Any other)	Event Organized by	Venue
01.12.2021	Symposium	National	Paper presenter	DAE-BRNS	DAE Convention Centre, BARC Mumbai.
14.12.2020	Symposium	International	Paper presenter	DAE-BRNS	NISER, Odisha.
23.12.2019	Symposium	National	Paper presenter	DAE-BRNS	University of Lucknow.
10.12.2018	Symposium	National	Paper presenter	DAE-BRNS	DAE Convention Centre, BARC Mumbai.
04.12.2018	Conference	International	Paper presenter	RIKEN Nishina Centre for Accelerator Based Science.	Saitama, Japan.
09.07.2018	Conference	International	Paper presenter	LPC, GANIL France	Caen, France.
05.12.2016	Symposium	National	Paper presenter	DAE-BRNS	SINP Kolkata.
07.12.2015	Symposium	National	Paper presenter	DAE-BRNS	SSSIHL, Prasanthi Nilayam, Andhra

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### 17. Workshops/ Symposia/ Conferences/ Colloquia/Seminars Organized (as Chairman/ Organizing Secretary/ Convenor / Co-Convenor)

Title of Activity	Level of Event (International/ National/ Local)	Date (s)	Role	Venue

### 18. Invited Talks delivered

Topic	Date	Inviting Organization

### 19. Membership of Learned Societies

Type of Membership (Ordinary Member/ Honorary Member / Life Member )	Organization	Membership No. with date
1. Ordinary Member	American Astronomical Society	58806 (2017).

### 20. Academic Foreign Visits

Country	Duration of Visit	Programme

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21. Publications

(A) Refereed Research Journals:

Author(s)	Title of Paper	Journal	Volume (No.)	Page numbers	Year	Impact Factor of the Journal (Optional)
Rana Nandi, <b>Somnath Mukhopadhyay</b> and Sarmistha Banik	Effect of the Landau quantization of electrons on the inner crusts of hot neutron stars	Physical Review C	104	025803-1	2021	3.199
Sujan Kumar Roy, <b>Somnath Mukhopadhyay</b> and D. N. Basu	Universal relationship for magnetized white dwarfs	European Physical Journal Plus	136	467-1	2021	3.911
Sujan Kumar Roy, <b>Somnath Mukhopadhyay</b> , Joydev Lahiri, Debasis Atta, Partha Roy Chowdhury and D. N. Basu	Gravitational waves from non-radial perturbations in neutron stars	Annals of Physics	415	168121-1	2020	3.036

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<b>Somnath Mukhopadhyay</b> and Sarmistha Banik	Gravitational waves from r-mode instability of massive young sub- and super-Chandrasekhar white dwarfs	European Physical Journal Plus	135	270-1	2020	3.911
Sujan Kumar Roy, <b>Somnath Mukhopadhyay</b> , Joydev Lahiri and D. N. Basu	Relativistic Thomas-Fermi equation of state for magnetized white dwarfs	Physical Review D	100	063008-1	2019	5.407
<b>Somnath Mukhopadhyay</b> , Joydev Lahiri, Debasis Atta, Kouser Imam and D. N. Basu	Gravitational waves from isolated neutron stars: Mass dependence of r - mode instability	Physical Review C	97	065804-1	2018	3.199
<b>Somnath Mukhopadhyay</b> , Debasis Atta, Kouser Imam, D. N. Basu and C. Samanta	Compact bifluid hybrid stars: hadronic matter mixed with self-interacting fermionic asymmetric dark matter	European Physical Journal C	77	440-1	2017	4.59
<b>Somnath Mukhopadhyay</b> , Debasis Atta and D. N. Basu	Landau quantization and mass-radius relation of magnetized white dwarfs in general	Romanian Reports in Physics	69	101-1	2017	2.147

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	relativity					
Debasis Atta, <b>Somnath Mukhopadhyay</b> and D. N. Basu	Nuclear constraints on the core-crust transition and crustal fraction of moment of inertia of neutron stars	Indian Journal of Physics	91	235	2017	1.947

(B) Conferences/Workshops/Symposia Proceedings

Author(s)	Title of Abstract/ Paper	Title of the Proceedings	Page numbers	Conference Theme	Venue	Year
Tambe Pranjal Anant, Rishabh Kumar, Sujan Kumar Roy and <b>Somnath Mukhopadhyay</b>	Thomas-Fermi Treatment for Hot and Magnetized White Dwarfs	Proceedings of the 65 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics, Volume 65, Year 2021.	476	65 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics	DAE Convention Centre, BARC Mumbai	2021
<b>Somnath Mukhopadhyay</b> , Rana Nandi and Sarmistha Banik	Inner crusts of hot magnetars in strong quantizing magnetic fields	Proceedings of the 65 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics, Volume 65, Year 2021.	474	65 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics	DAE Convention Centre, BARC Mumbai	2021
<b>Somnath Mukhopadhyay</b> , Sujan Kumar Roy and D. N. Basu	I-Eccentricity-Q Relation as the Universal Relation for Rotating	Springer Proceedings in Physics	(Accepted for publication)	XXIV DAE-BRNS Symposium on High Energy Physics	NISER, Odisha	2020

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	Magnetized White Dwarfs					
Debasis Atta, <b>Somnath Mukhopadhyay</b> and D.N. Basu	R-Mode Instability of Neutron Stars Using Nuclear EoS from DDM3Y	Springer Proceedings in Physics, Volume 238, Year 2020.	223	XXII International Conference on Few-Body Problems in Physics (FB22)	Caen, France	2020
Sujan Kumar Roy, Joydev Lahiri and <b>Somnath Mukhopadhyay</b>	Tidal Deformability in Compact Star Merger Events	Proceedings of the 64th DAE BRNS Symposium on Nuclear Physics, Volume 64, Year 2019.	610	64th DAE BRNS Symposium on Nuclear Physics	University of Lucknow	2019
Sujan Kumar Roy, <b>Somnath Mukhopadhyay</b> , Joydev Lahiri and D. N. Basu	Gravitational waves from non-radial perturbations in neutron stars	Proceedings of the 64th DAE BRNS Symposium on Nuclear Physics, Volume 64, Year 2019.	614	64th DAE BRNS Symposium on Nuclear Physics	University of Lucknow	2019
Sujan Kumar Roy, <b>Somnath Mukhopadhyay</b> , Joydev Lahiri and D. N. Basu	Relativistic Thomas-Fermi EoS of magnetic White Dwarfs	Proceedings of the 63 <sup>rd</sup> DAE BRNS Symposium on Nuclear Physics, Volume 63, Year 2018.	760	63 <sup>rd</sup> DAE BRNS Symposium on Nuclear Physics	DAE Convention Centre, BARC Mumbai	2018

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<b>Somnath Mukhopadhyay,</b> Debasis Atta and D. N. Basu	Mass-Radius Relationship of Neutron Stars Admixed with Fermionic Asymmetric Dark Matter	JPS Conference Proceedings, Volume 32, Year 2020.	010073	13th International Conference on Nucleus-Nucleus Collisions (NN2018)	Saitama, Japan	2018
Debasis Atta, <b>Somnath Mukhopadhyay</b> and D. N. Basu	Effect of the DDM3Y Nuclear Equation of State on the R-mode Instability of Neutron Stars	JPS Conference Proceedings, Volume 32, Year 2020.	010071	13th International Conference on Nucleus-Nucleus Collisions (NN2018)	Saitama, Japan	2018
Debasis Atta, <b>Somnath Mukhopadhyay</b> , D. N. Basu and C. Samanta	Interacting & non-interacting fermionic dark matter and quark matter compact stars	Proceedings of the 61 <sup>st</sup> DAE BRNS Symposium on Nuclear Physics, Volume 61, Year 2018.	890	61 <sup>st</sup> DAE BRNS Symposium on Nuclear Physics	SINP, Kolkata	2016
Debasis Atta, <b>Somnath Mukhopadhyay</b> and D. N. Basu	Crustal fraction of moment of inertia in pulsars	Proceedings of the 60 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics, Volume 60, Year 2015.	854	60 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics	SSSIHL, Prasanthi Nilayam	2015
<b>Somnath</b>	Mass-radius	Proceedings	838	60 <sup>th</sup> DAE	SSSIHL,	2015

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<b>Mukhopadhyay,</b> Debasis Atta and D. N. Basu	relation of magnetized White Dwarfs	of the 60 <sup>th</sup> DAE BRNS Symposium on Nuclear Physics, Volume 60, Year 2015.		BRNS Symposium on Nuclear Physics	Prasanthi Nilayam	
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(C) Books & Monographs

Author(s)	Title of Book/Monograph	Name of Publishers	Year of Publication	ISSN/ISBN Number