Satadal Datta

Curriculum Vitae

Basic Info

Gender	Male
Date of Birth	29th November, 1991
Place of Birth	Kolkata, West Bengal, India
Marital Status	Single
Nationality	Indian

Known Languages

Mother Tongue	Bengali
Second Language	English
Intermediate	Hindi (can speak only)

Interests

-Watching night sky, I've a personal telescope, -I love animals, -Listening to music, Playing football, badminton, table tennis -Cycling -Travelling

Education

2010–2012 **Undergraduate in Physics With Hons**, *Narasinha Dutt College (http://narasinhaduttcollege.edu.in/) under the University of Calcutta (http://www.caluniv.ac.in/), West Bengal*, India, First Class Honours.

2012–2014 **Postgraduate in Physics (MS)**, *Harish-Chandra Research Institute (http://www.hri.res.in/), Allahabad*, India, Obtained 76.95 percentage of marks.

2014-2020 January **PhD in Theoretical Astrophysics**, *Harish-Chandra Research Institute (http://www.hri.res.in/), Allahabad*, India, PhD Supervisor: Prof. Tapas Kumar Das (http://www.hri.res.in/ tapas/).

PhD Thesis

Title	*Emergent Gravity Phenomena In Accreting Astrophysical Systems*
Supervisors	Professor Tapas Kumar Das

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Description Studying analogue gravity phenomena in accreting astrophysical flows onto strong gravitating objects like black hole, neutron star etc. Spherically symmetric and Sub-Keplarian disk accretion models are chosen for linear stability analysis of the steady state flow.

Integrated PhD Course Work

Semester 1 Mathematical Methods 1 (Roughly at the level of James Ward Brown and Ruel V. Churchill: Complex Variables and Applications), Classical Mechanics (Roughly at the level of Herbert Goldstein, John Safko, Charles P. Poole), Quantum Mechanics 1 (Roughly at the level of Cohen Tannoudji; David J Griffiths, Landau and Lifschitz), Classical Electrodynamics (Roughly at the level of David J Griffiths)

Semester 2 Mathematical Methods 2 (Roughly at the level of Arfken; David Tong Leture notes) , Quantum Mechanics 2 (Roughly at the level of J. J. Sakurai; Franz Schwabl; Landau and Lifschitz), Statistical Mechanics (Roughly at the level of Kerson Huang), Numerical Methods (Roughly at the level of Stephen Prata)

Semester 3 Quantum Field Theory 1 (Roughly at the level of Peskin and Schroeder, Steven Weinberg: The Quantum Theory of Fields: Volume 1, Foundations), General Theory of Relativity (Roughly at the level of Steven Weinberg: Gravitation and Cosmology), Condensed Matter Physics 1

Semester 4 Particle Physics (Roughly at the level of Francis Halzen (Author), Alan D. Martin: Quarks and Leptons), Theoretical Astrophysics (Roughly at the level of Cathie Clarke and Bob Carswell: Astrophysical Fluid Dynamics; Landau and Lifschitz: Fluid Mechanics) Projects Done

Semester 2 -An Experimental Project on Deep Level Transient Signal Technique in semiconductors to detect defect levels in band gap at Indira Gandhi Centre for Atomic Research (IGCAR) (http://www.igcar.gov.in/), India -A Numerical Project under Prof. Tapas Kumar Das on Lane-Emden equation of stars -A Project under Prof. Jayanta Kumar Bhattacharjee on Nonlionear Dynamics

Semester 3 -A Project under Prof. Rajesh Gopakumar on Coherent States in Quantum Mechanics

Semester 4 -An experimental project on Ring Laser Gyroscope at National Institute of Science Education and Research (NISER) (http://www.niser.ac.in/), India

Semester 5 -A Small Project under Prof. Pinaki Majumdar on Analogue Gravity in Bose Einstein Condensate system

Semester 4-5 -A detail Project (two semester project) under Prof. Tapas Kumar Das on Self Gravitating spherically symmetric nonrelativistic accretion

Courses Audited During PhD

Jan 2016 -May 2016 , Advanced Course on Dynamical Systems (Roughly at the level of Steven Strogatz; Jordan and Smith) by Prof. Jayanta Kumar Bhatacharjee.

Jan 2017 -May 2017 , Qunatum Field Theory 2 (Roughly at the level of Peskin and Schroeder) by Prof. Ashoke Sen.

Aug 2017 -Oct 2017 , Advanced Course on Quantum Field Theory (Roughly at the level of Mikko Laine, Aleksi Vuorinen, arXiv:1701.01554) by Prof. Ashoke Sen.

Publications

1. **Acoustic Analogue of Gravitational Wave**, *Satadal Datta*, Phys. Rev. D 98, 064049, (2018).
2. **Bondi flow revisited**, *Satadal Datta*, Astrophysics and Space Science, 361:260, (2016).
3. **Acoustic geometry obtained through the perturbation of the Bernoulli's constant**, *Satadal Datta Md. Arif Shaikh, Tapas K Das*, New Astronomy, Volume 63, (2018).
4. **Analogue tachyon in Jeans Cloud**, *Satadal Datta*, arXiv:1707.03284, (2017).
5. **Amplitude death by delay induced position coupling in a system of two coupled Van der Pol Oscillators**, *Satadal Datta*, arXiv:1709.09909, (2017).
6. **Bifurcations of a Van der Pol oscillator in a double well**, *Satadal Datta*, arXiv:1709.10126, (2017).
7. **A parametric model to study the mass radius relationship of stars**, *Safiqul Islam, Satadal Datta, Tapas K Das*, Praman J. Phys 92, 1-15, (2019).
8. **Instabilities in nonrelativistic spherically symmetric self-gravitating accretion**, *Satadal Datta*, arXiv:1902.00359 [astro-ph.HE], (2019).
9. **Lagrangian Description of Accreting Black Hole Systems in the Context of Emergent Spacetime**, *Satadal Datta,Tapas Kumar Das*, arXiv:1910.06768 [gr-qc], (2018).
10. **Higher Dimensional Limit Cycles and Coupling Induced Synchronization in Dynamical Systems**, *Satadal Datta, Jayanta Kumar Bhattacharjee and Dibya Kanti Mukherjee*, arXiv:2004.10004 [nlin.CD] , (2020).
11. **Simulating gravity in rotational flow**, *Satadal Datta, Arpan Krishna Mitra*, arXiv:2007.10954 [gr-qc], (2020).
12. **Fluid-dynamical analogue of nonlinear gravitational wave memory**, *Satadal Datta, Uwe R. Fischer*, arXiv:2011.05837 [gr-qc], (2020).

Workshops and Conferences attended

March, 2017 **XXXV Meeting of Astronomical Society of India (ASI)**, *http://astronsoc.in/asi2017/*, India, I prsented a poster.

May, 2017 **29th meeting of the Indian Association for General Relativity and Gravitation (IAGRG)**, *http://www.iitg.ernet.in/iagrg29/*, India, I prsented a poster and a short talk about the contents of the poster.

February, 2018 **XXXVI Meeting of Astronomical Society of India (ASI)**, *http://astronsoc.in/asi2018/*, India, I presented a poster.

March 2018 **International Workshop on Bose-Einstein Condensation and related phenomena(IWBECRP)**, India, I attended the talks.

Teaching Assistantship

Jan-May 2015 , I tutored theoretical Astrophysics course, course instructor: Prof. Tapas Kumar Das.

Jan-May, 2017 , I tutored theoretical Astrophysics course, course instructor: Prof. Tapas Kumar Das.

Awards

2012-2019 , Received DAE fellowship from Harish-Chandra Research Institute.

2012 , Secured 5th rank in all India based exam for BSc students, Joint Admission Test (IIT-JAM) (http://jam.iitb.ac.in/).

2012 , Secured 47th rank in all india based exam for both BSc and MSc candidates, Joint Entrance Screening Test (JEST) (https://www.jest.org.in/).

2018 , Received Infosys Award.

My Expertise

Theoretical Aspects in the following areas of Physics.

- Fluid Dynamics
- General Relativity
- Analogue Gravity
- Accretion models in Astrophysics
- Nonlinear Dynamics
- Bose-Einstein Condensate

Computer skills

C++, Mathematica, GNU plot, Veusz Plot, LATEX, Parallel Computing

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