

# FACULTY PROFILE (CURRICULUM VITÆ)

1. **Name:** Siddhartha Sinha

2. **Current Affiliation:** Assistant Professor in Physics,  
Khatra Adibasi Mahavidyalaya (affiliation- Bankura  
University) from 15th March, 2015

2. **Address for Correspondence:** Department of  
Physics,  
Khatra Adibasi Mahavidyalaya,  
Khatra, Bankura, West Bengal 722140

**email:** siddhartha.sinha0@gmail.com

**Tel.(mobile):** 8697342455

**Tel.(landline):** 2417-1982

3. **Date of Birth:** 14 February 1979

4. **Educational Qualification**



Sl. No.	Degree	University/Board	Year	Subject
1.	Madhyamik	W.B. Board of Secondary Education	1995	additional: Mechanics
2.	Higher Secondary	W.B. Council of Higher Secondary Edu.	1997	Physics, Chemistry, Maths, Stats(4th sub.)
3.	B. Sc. (Honours)	Calcutta University	2001	Physics(Hons);Chem., Maths (Pass)
4	M. Sc.	Kalyani University	2003	Physics; Nuclear & Particle Phys(Special)
5	Ph. D.	Indian Institute of Science,Bangalore	2009	General Relativity & Gravitational Waves
6	N.E.T.	U.G.C.	2009	Lectureship
7	Post.Doctoral	S.N.Bose National Centre for Basic Sciences, Kol.	2009-2012	Foundations of Quantum Mechanics, & Cosmology
8	Teaching (Part-time)	St. Xavier's College Kolkata	2012 July-Dec	Phys Hons & Pass Theo. & Practical
9	Teaching (Guest Lect)	Sarojini Naidu College, Kolkata	Dec, 2012 Feb- 2015	Phys Hons & Pass Theo. & Practical
10	Teaching (Whole-Time)	Vivekandanda College, Kolkata	Sept,2013-Feb, 2015	Phys Hons & Pass Theo. & Practical
11	Teaching (Substantive)	Khatra Adibasi Mahavidyalaya	March, 2015-	Phys Hons & Pass Theory & Practical

**Thesis Topic** : *3 PN Gravitational wave polarisations and applications to Astrophysics and Cosmology*

**Thesis Supervisor** : Dr. Bala R Iyer  
Theoretical Physics Group, Raman Research Institute,  
Sadashivanagar, Bangalore 560080, India.

## List of Publications

- [1] K. G. Arun, Bala R. Iyer, B. S. Sathyaprakash and Siddhartha Sinha, *Higher harmonics increase LISA's mass reach for supermassive black holes*, Physical Review D, **75**, 124002 (2007).
- [2] K. G. Arun, Bala R. Iyer, B. S. Sathyaprakash, Siddhartha Sinha and Chris Van Den Broeck , *Higher signal harmonics, LISA's angular resolution, and dark energy*, Physical Review D, **76**, 104016 (2007).
- [3] Luc Blanchet, Guillaume Faye, Bala R. Iyer and Siddhartha Sinha, *The third post-Newtonian gravitational wave polarisations and associated spherical harmonic modes for inspiralling compact binaries in quasi-circular orbits*, Classical and Quantum Gravity, **25**, 165003 (2008)
- [4] K. G. Arun *et. al*, *LISA as a dark energy probe*, Classical and Quantum Gravity, **26**, 094201 (2009)
- [5] K. G. Arun *et. al*, *Massive Black-hole binary inspirals: results from the LISA parameter estimation taskforce*, Classical and Quantum Gravity **26**, 094207 (2009)
- [6] K. G. Arun, Luc Blanchet, Bala R. Iyer and Siddhartha Sinha, *Third post-Newtonian angular momentum flux and the secular evolution of orbital elements for inspiralling compact binaries in quasi-elliptical orbits*, Physical Review D, **80**, 124018 (2009)
- [7] A.S. Majumdar, D. Home and Siddhartha Sinha, *Dark Energy from quantum wave function collapse of dark matter*, Physics Letters B, **679**, 167 (2009)
- [8] P Chowdhury *et. al*, *Strong quantum violation of the gravitational weak equivalence principle by a non-Gaussian wave packet*, Classical and Quantum Gravity **29**, 025010 (2012)
- [9] S Nag, S Sinha, Deepika B Ananda and T K Das *Influence of the black hole spin on the chaotic particle dynamics within a dipolar halo*, Astrophysics & Space Science **362**, no. 4, 81 (2017)

## Research Interests

- Gravitational radiation emission from inspiralling compact binaries and evolution of the source under radiation reaction. Effects of eccentricity on gravitational wave linear and angular momentum flux. Effect of higher harmonics of the gravitational wave, in particular, improved angular resolution of space-based interferometric detectors (LISA) and resulting identification of the host galaxies of super-massive black hole binaries and constraints on the dark energy equation of state.
- Foundations of Quantum mechanics, Quantum Time-of-Arrival - relativistic and non-relativistic approaches, Hartmann Effect, Bohmian Mechanics, applications of quantum entanglement in understanding the origins of Dark Matter and Dark Energy, Interacting fluids in Cosmology and Primordial Black Holes
- Black Hole Accretion Physics. Particle dynamics in near the equatorial plane of a Kerr black hole (represented as a pseudo-potential) embedded in a galactic potential. The host galaxy potential acts as a perturbation which breaks the reflection of the isolated black-hole system. Galactic perturbing potentials of dipolar (or higher orders) are expected to lead to chaotic orbits. We study the Poincaré sections to look for signatures of chaos & try to quantify the effect of the host galaxy on the dynamical trajectories.

## Seminar and Poster Presentations

- [1] *How higher harmonics can help LISA to see more massive binary supermassive black hole inspirals* at the 18th International Conference on General Relativity and Gravitation (GRG18) and 7th Edoardo Amaldi Conference on Gravitational Waves, Sydney, Australia, 8-14 July 2007.
- [2] *Dark Energy and Quantum Entanglement: Various Approaches* at the international conference titled **75 years of Quantum Entanglement: Foundations and Information Theoretic Applications**, Kolkata, India, 6-10 January 2011.

## Workshops/Symposia attended

- [1] Workshop on Black Hole astrophysics, titled “2nd ASTROSAT workshop on Black Hole Astrophysics” at BARC Training School Hostel, Bhabha Atomic Research Centre, Mumbai, 10-16th May, 2004.
- [2] Workshop on gravitational wave physics titled “Gravitational Waves, Relativistic Astrophysics and Cosmology ” at Centre Emile Borel, Institut Henri Poincare, Universite Pierre et Marie Curie, Paris, 30th October to 20th November, 2007.
- [3] 126-th Orientation Programme, Calcutta University, August 30- September 20, 2019.
- [4] NEP Orientation & Sensitization Programme, Burdwan University, April 18- April 29, 2024.

## Courses currently teaching:

- [1] SHPHS/101/C-1 Mathematical Physics I
- [2] SHPHS/103/GE-1 Mechanics, Electrostatics & Sound
- [3] SP/PHS/101/C-1A Physics I
- [4] SHPHS/202/C-4 Waves & Optics
- [5] SHPHS/203/GE-2 Electromagnetism & Thermal Physics
- [6] SP/PHS/201/C-1B Physics II
- [7] SHPHS/301/C-5 Mathematical Physics II
- [8] SHPHS/302/C-6 Thermal Physics I
- [9] SHPHS/401/C-8 Mathematical Physics III
- [10] SHPHS/402/C-9 Elements of Modern Physics
- [11] SHPHS/405/SEC-2 Radiation Safety
- [12] SP/PHS/404/SEC-2/Radiation Safety
- [13] SHPHS/501/C-11 Quantum Mechanics & Applications
- [14] SHPHS/503/DSE-1 Classical Dynamics
- [15] SHPHS/504/DSE-2 Nuclear & Particle Physics
- [16] SP/PHS/501/DSE-1A Classical Dynamics
- [17] SHPHS/602/C-14 Statistical Mechanics
- [18] SHPHS/603/DSE-3 Physics of Earth
- [19] SP/PHS/601/DSE-1B Physics of Earth