




## Faculty Details proforma for DU Web-site

Title	Dr.	First Name	<b>SOURIN</b>	Last Name	<b>DAS</b>	Photograph
Designation		Assistant Professor				
Address		Warden Flat 1, Tapti Hostel, Jawaharlal Nehru University, New Delhi 110067				
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Email		sdas@physics.du.ac.in, sdas.du@gmail.com				
Web-Page						
<b>Educational Qualifications</b>						
Degree		Institution			Year	
Ph.D.		Harish-Chandra Research Institute, Allahabad			2004	
M.Sc.		Kalyani University , West Bengal			1998	
B.Sc.		Calcutta University, West Bengal			1996	
<b>Career Profile</b>						
<b>Period</b>		<b>Position</b>			<b>Institution</b>	
Oct 2013 - Nov 2014		Guest Scientist (on leave from DU)			MPIPKS, Dresden, Germany	
Aug 2010 - present		Assistant Professor			Dept of Physics and Astrophysics, Delhi University, India	
2009 - 2010		Post-doctoral Fellow			IFF-Theorie 3, Forschungszentrum, Juelich, Germany	
Feb - Dec 2008		Research Associate			CHEP, IISc Bengaluru	
Oct 2004 - Dec 2007		Feinberg Post-doctoral Fellow			Weizmann Institute of Science, Rehovot, Israel	
2002 - Oct 2004		Senior Research Fellow			Harish-Chandra Research Institute, Allahabad, India	
Aug 2001 - Aug 2002		Visiting Ph D Student			Pennstate University, USA	
1998 - 2001		Junior Research Fellow			Harish-Chandra Research Institute, Allahabad, India	
<b>Areas of Interest / Specialization</b>						

Mesoscopic Physics (Transport Quantum Dots and Quantum Wires), Spintronics, Strongly correlated systems in low dimensions, 2D Electron Gas in strong magnetic field (Quantum Hall Effect), Topological insulators and Topological superconductors, Weyl semimetals, geometric phase in quantum systems.

#### Subjects Taught

#### **Postgraduate courses at Department of Physics and Astrophysics, DU :**

COURSE	SUBJECT	YEAR
PHYS 410	Laboratory Course II (Solid State Physics and Waves and Optics)	Jan – May 2015
PHYS 407	Statistical Mechanics	Jan – May 2015
NSNT 504	Carbon Nanotubes and their composites	Jul – Dec 2012
PHYS 573	Advanced Solid State Theory II	Jan – May 2012
NSNT 201	Quantum Mechanics	Jan – May 2011, 2012, 2013
PHYS 406	Quantum Mechanics II	Jan – May 2011
NSNT 102	Introductory Physics	Jul – Dec 2010, 2011, 2012,2013

#### **Postgraduate Courses at Department of Physics, Aachen University :**

CAPACITY	SUBJECT	YEAR
Teaching Assistant with Prof. M. R. Wegewijs	Quantum many body theory (SS-2009)	Spring 2009

#### **Undergraduate courses at Department of Physics, Penn State University :**

CAPACITY	SUBJECT	YEAR
Lecturer and course administrator	Mechanics	Summer 2002
Teaching Assistant	Electricity and Magnetism	Fall 2001 and Spring 2002

#### Research Guidance

#### **Complete supervision of doctoral thesis :**

NAME	THESIS TITLE	STATUS
Disha Wadhawan	Transport properties of	In progress (Oct 2010 - present)

	mesoscopic systems	
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**Supervision of M.Sc./ M.Tech. Dissertations :**

NAME	TOPIC	STATUS
Sayon Basu	Discrete symmetries in condensed matter physics and application to spin-orbit systems	Completed (Jan 2013 – Apr 2013)
Jyoti Krishna	Discrete symmetries in condensed matter physics and application to spin-orbit systems	Completed (Jan 2013 – Apr 2013)
Bhagya Nair	Pure spin current in multi-terminal strongly interacting magnetic quantum dots	Completed (Jul – Dec 2012)
Preeti Sharma	Thermoelectrically generated spin currents in quantum dots with magnetic contacts	Completed (Jul – Dec 2012)
Rabindra Bhattarai	Study of helical edge states in presence of magnetic fields : fractionally charged domain wall	Completed (2011 – 2012)
Anwasha Dutta	Quantum quenching in helical edge states	Completed (2011 – 2012)

**Supervision of summer project students from Indian Academy of Sciences :**

NAME	TOPIC	STATUS
M G Bhavannarayana	Spectroscopic study of organic thin films of organic semiconductors	Completed (May 2016 – July 2016)
Aneesha Avasthi	UV Absorption and Photoluminescence study of Alpha Sexithiophene	Completed (May 2016 – July 2016)
Saikat Payra	Topological aspect of 1+1 dimensional Dirac fermions in presence of mass domain wall	Completed (May 2015– July 2015)
Dr.G.Ramadevudu	Electrical, optical and spectroscopic characterization of polyallylamine functionalized graphene and garphene oxide flake	Completed (May 2013– July 2013)

**Partial supervision of M.Sc. Diploma thesis :**

NAME	THESIS TITLE	STATUS
Michael Baumgaertel (at IFF3, Forschungszentrum, Juelich)	Transport through high spin quantum dot spin valve	Completed (2009 – 2010)

**Recent Publications/Preprints :**

1. Quantum Hall realization of polarized intensity interferometry  
Krishanu Roychowdhury, Disha Wadhawan, Poonam Mehta, Biswajit Karmakar, Sourin Das

Journal-ref: **Phys. Rev. B 93, 220101 (Rapid Communication) (2016)**

2. Fingerprints of Majorana bound states in Aharonov Bohm geometry  
Krashna Mohan Tripathi, Sourin Das, Sumathi Rao

Journal-ref: **Phys. Rev. Lett. 116, 166401 (2016)**

3. Transport signatures of surface potentials on three-dimensional topological insulators  
Sthitadhi Roy, Sourin Das

Journal-ref: **Phys. Rev. B 93, 085422 (2016)**

4. Pseudospin-valve effect on transport in junctions of three-dimensional topological insulator surfaces  
Sthitadhi Roy, Krishanu Roychowdhury, Sourin Das

Journal-ref: **New J. Phys. 18, 073038 (2016)**

5. Geometric phase in p- n junctions of helical edge states  
Disha Wadhawan, Poonam Mehta, Sourin Das

Journal-ref: **Phys. Rev. B 93, 085310 (2016)**

6. Probing surface states exposed by crystal terminations at arbitrary orientations of 3D topological insulators  
Sthitadhi Roy, Kush Saha, Sourin Das

Journal-ref: **Phys. Rev. B 91, 195415, (2015)**

7. Exceptional-point avatar of Majorana fermions in one dimension  
Sourin Das, Indubala I Satija

Journal-ref: **arXiv:1409:6139**

**Selected list of Publications :**

1. Tunnel Magnetoresistance scan of a pristine three-dimensional topological insulator

Sthitadhi Roy, Abhiram Soori, Sourin Das  
Journal-ref: **Phys. Rev. B** **91**, 041109 (Rapid), (2015)

2. Thermoelectric probe for neutral edge modes in the fractional quantum Hall regime  
Giovanni Viola, Sourin Das, Eytan Grosfeld, Ady Stern  
Journal-ref: **Phys. Rev. Lett.** **109**, 146801 (2012)

3. Spin quadrupoletronics: moving spin anisotropy around  
Michael Baumgärtel, Michael Hell, Sourin Das, Maarten R. Wegewijs  
Journal-ref: **Phys. Rev. Lett.** **107**, 087202 (2011)

4. Probing the neutral edge modes in transport across a point contact via thermal effects in the Read-Rezayi non-abelian quantum Hall states  
Eytan Grosfeld, Sourin Das  
Journal-ref: **Phys. Rev. Lett.** **102**, 106403 (2009)

5. Duality between normal and superconducting junctions of multiple quantum wires  
Sourin Das, Sumathi Rao  
Journal-ref: **Phys. Rev. B** **78**, 205421 (2008)

For an up to date list of my publications, please see [arxiv.org](http://arxiv.org) [cond-mat].

Conference Organization/ Presentations (in the last three years)

### Talks :

1. Dept. of condensed matter physics, ICTP, Trieste, Italy on 18 July, 2016

Title : Majorana fermions in one dimension

2. Colloquium at the Physics department of IIT Kanpur on March 18, 2016

Title : Geometric phase in multi-particle particle interferometry

3. Two lectures at Workshop On Frontiers In Condensed matter Physics in IOP, Bhubaneswar on Feb 22 - 27, 2016

Title : An introduction to Majorana fermion in 1-D p-wave superconductor

4. Talk at IISER, Kolkata on Dec 21, 2015

Title : Majorana fermions in one dimension

5. Talk at HRI, Allahabad on Dec 17, 2015

Title : Majorana fermions in one dimension

6. Talk at Dept. of Physics, IISc, Bangalore on Dec 6, 2015

Title : Majorana fermions in one dimension

7. Two lectures at 1st Refresher Course in Physics at UGC-Human Resource Development Centre, Jawaharlal Nehru University on October 6, 2015 and October 13, 2015

Title (Lecture-1) : Introduction to concept of Berry phase (geometric phase) in Quantum Mechanics

Title (Lecture-2) : Application of Berry phase in quantum electronics

8. Workshop on Interacting Fermions: Precision Theory and Experiment, ICTP, Trieste, Italy from July. 6-10, 2015

Title : Two particle spin Aharonov Bohm effect on the Bloch sphere

9. S. N. Bose Center, Kolkata, on July. 1, 2015

Title : Topological state of matter: theory and experiments

10. University of Wuerzburg, Germany on June. 1, 2015

Title : Probing topological insulators in two and three dimensions

11. SINP, Kolkata, 19 Mar, 2015

Title : Topological insulators in two and three dimensions

12. Deshbandhu College, University of Delhi, 24 Feb, 2015

Title : Topological state of matter : from topological insulators to topological superconductors

13. Institute for Quantum Information (IQI), RWTH, Germany on May. 08, 2014

Title : Spin polarized injection of electrons as a unique probe for 2-D and 3-D topological insulator surface state

14. DPG Spring Meeting, Dresden, Germany on Apr. 10, 2014

Title : PN junctions of Topological Insulators

15. Dahlem Center for Complex Quantum Systems, Freie Universitt Berlin, Germany on Apr. 10, 2014

Title : Spin polarized injection of electrons as a unique probe for 2-D and 3-D topological insulator surface state

16. India UK scientific seminar (DST and Royal Society, London) From Graphene analogs to Topological Insulators (GATI 2014), Vedic Village, Kolkata, Jan. 27, 2014

Title : Spin polarized tunneling probes for topological insulators

17. Visitors program in the Department of Physics and Astrophysics, Delhi University,

*Delhi, India, on Mar. 1-2, 2013*

*Title : Dissipation, out of equilibrium noise and heating in quantum Hall edge Circuitry*

*18. Meeting on "Transport in Topological Insulators, HRI, Allahabad, India, during Jul. 2013*

*Title : Berry phases in topological insulators*

*19. IIT Guwahati, during Jul. 15, 2013*

*Title : Pancharatnam's geometric phase in electrical transport in 2-D topological insulators*

*20. Subrahmanyam Chandrasekhar discussion meeting on Advances in Graphene, Majorana fermions and quantum computation, ICTS program, New Physical Sciences Building, IISc, Bangalore, India during 19-21 Dec, 2012*

*Title : Dissipation, out of equilibrium noise and heating in quantum Hall edge circuitry*

*21. Two lectures in the 12th Refresher Course in Physics, JNU, New Delhi, India, during Sept, 2012*

*Title : Introduction to solid state quantum qubits using quantum dots*

*22. Department of Physics and Astronomy, George Mason University, Fairfax VA, USA on Jun., 2012*

*Title : Detecting neutral modes via thermoelectric effect in non-abelian quantum Hall states*

*23. Symposium on Frontiers of quantum matter, Center for Quantum Science, George Mason University, Fairfax VA, USA on Jun. 22, 2012*

*Title : Story of Majorana fermions*

*24. MIPKs, Dresden, Germany on May. 30, 2012*

*Title : Detecting neutral modes via thermoelectric effect in non-abelian quantum Hall states*

*25. SPS, JNU, New Delhi, India, on Apr. 11, 2012*

*Title : Looking for neutral modes in non-abelian quantum Hall states via thermoelectric effect.*

*26. IACS, Kolkata, India, on Mar 6, 2012*

*Title : Looking for neutral modes in non-abelian quantum Hall states via thermoelectric effect*

*27. CHEP, Bangalore, India, on Mar 8, 2012*

*Title : Looking for neutral modes in non-abelian quantum Hall states via thermoelectric effect*

*28. CTP, Jamia Millia Islamia, New Delhi, India, during Mar. 16, 2012*

*Title : Looking for neutral modes in non-abelian quantum Hall states via thermoelectric effect*

29. 11th Refresher Course in Physics, JNU, New Delhi, India, during Feb, 2012  
Title : Introduction to the interacting quantum dots

Conference Organization:

1. Organised a conference on Recent Trends in Nanoscience and Nanotechnology during 15-16 Oct., 2012

2. Organised a conference on "National Seminar on Frontiers of Condensed Matter Physics" during 12-14 Apr., 2013

Research Projects (Major Grants/Research Collaboration)

Awards and Distinctions

POSITION	INSTITUTION	DURATION
Adjunct Professor (Junior level)	Harish-Chandra Research Institute, Allahabad	Dec 2014 – Dec 2016
Regular Associate	ICTP, Trieste, Italy	Jan 2014 – Dec 2019

Association With Professional Bodies

**Refereeing for –**

Americal Physical Society (PRL, PRB)  
Europhysics Letters  
Solid State Communications  
Pramana

Other Activities