

Shubho R. Roy

POSITION AND AFFILIATION

Assistant Professor, Department of Physics, Indian Institute of Technology, Hyderabad.

CONTACT INFORMATION

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Department of Physics
Indian Institute of Technology, Hyderabad (IITH)
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BIOGRAPHICAL INFORMATION

Born on January 18, 1981, at Kolkata, India.
Citizen of the Republic of India.

RESEARCH INTERESTS

Theoretical High Energy Physics, broadly defined. I have been working on the following topics:

- Non-perturbative setups in string theory viz. the Gauge-Gravity correspondence to explore Quantum Black Holes and Cosmologies,
- Gravity in (2+1)-dimensions, including higher spin gravity (Chern-Simons)
- Anomalous dynamics of Non-abelian charged fluids (quark gluon plasma).

EMPLOYMENT HISTORY

- **Assistant Professor** **March 2016-Present**
High Energy Physics Group, Department of Physics, Indian Institute of Technology, Hyderabad, Telangana, India.

- **Postdoctoral Fellow** **October 2014-march 2016**
High Energy Physics Group, Hebrew University of Jerusalem, Jerusalem, Israel.

- **Research Associate** **October 2012-July 2014**
Center for High Energy Physics, Indian Institute of Science, Bangalore, India.

- **Postdoctoral Fellow** **March 2010-June 2012**
Theoretical High Energy Physics Group, City College of the CUNY, New York, NY and CUNY Research Foundation.

- **Adjunct Assistant Professor** **September 2010-December 2010**
Department of Physics and Astronomy, Lehman College of the CUNY, Bronx, NY USA.

PROFESSIONAL
PREPARATION

Brown University, Providence, RI USA

Ph.D, Theoretical High Energy Physics May 2010

- Thesis: Holographic description of black holes and cosmic inflation in asymptotically anti de Sitter backgrounds
- Advisor: **David A. Lowe (Professor of Physics)**

Sc.M, Physics May 2006

Indian Institute of Technology, Kanpur, UP India

- M.Sc, Physics June 2004

Presidency College, University of Calcutta, Kolkata, WB India

B.Sc June 2002

- Physics (Honors)
- Mathematics and Statistics (General)

VISITORSHIPS

• **Visitor** Jul. 26 - Aug. 4, 2017
Institute of Theoretical Physics (ITP), University of Bern, Switzerland.

• **Visitor** Aug. 19 - Sept. 2, 2015
Laboratoire de Physique Thorique et Hautes Energies (LPTHE) and Ecole Normale Suprieure (ENS), Paris, France.

• **Visitor** Aug. 1 - Sept. 30, 2014
Theory Division, Saha Institute of Nuclear Physics (SINP), Kolkata, India.

• **Visitor** Sept. 13 - Sept. 18, 2014
Department of Theoretical Physics, Tata Institute of Fundamental Research (DTP, TIFR), Mumbai, India.

• **Visitor** Sept. 9, 2014 - Sept. 13, 2014
International Centre for Theoretical Sciences, Bangalore, India.

PUBLICATIONS

- [1] Shubho R. Roy and D. Sarkar. **Holographic bulk reconstruction with α' corrections** Phys. Rev. D 96 (2017) 086018
- [2] Shubho R. Roy and D. Sarkar. **Hologram of a pure state black hole** PhysRevD.92.126003 (2015)
- [3] Shubho Roy and C. Krishnan. **Desingularization of the Milne Universe** Phys. Lett. B 734 (2014)
- [4] Shubho Roy and C. Krishnan, A. Raju **A Grassmann Path From AdS₃ to Flat Space** JHEP 1403 (2014) 036.

- [5] Shubho Roy and C. Krishnan, A. Raju and S. Thakur **Higher Spin Cosmology** *Phys. Rev. D* **89** (2014) 045007.
- [6] Shubho Roy and C. Krishnan **Higher Spin Resolution of a Toy Big Bang** *Phys.Rev. D* **88** (2013) 044049.
- [7] Shubho Roy, N. Iizuka, D. Kabat, and D. Sarkar **Black Hole Formation in Fuzzy Sphere Collapse** *Phys.Rev. D* **88** (2013) 044019.
- [8] Shubho Roy, N. Iizuka, D. Kabat, D. Sarkar **Black Hole Formation at the Correspondence Point** *Phys. Rev. D* **87**, 126010 (2013).
- [9] Shubho Roy, D. Kabat, G. Lifschytz, D. Sarkar **Holographic representation of bulk fields with spin in AdS/CFT** *Phys. Rev. D* **86**, 026004 (2012).
- [10] Shubho Roy, V.P. Nair, R. Ray. **Fluids, Anomalies and the Chiral Magnetic Effect: A Group-theoretic Formulation** *Phys. Rev. D* **86**, 025012 (2012).
- [11] Shubho Roy and D.A. Lowe. **Punctuated Inflation via AdS/CFT** *Phys. Rev. D* **82**, 063508 (2010).
- [12] Shubho Roy and D.A. Lowe. **Holographic description of asymptotically AdS₂ collapse geometries.** *Phys. Rev. D* **78**, 124017 (2008).
- [13] Shubho Roy and D.A. Lowe. **Chiral Geometries of 3d Gravity.** *Phys.Lett.B* **668**:159-162,2008.

ARTICLES IN
PREPARATION

- [1] Eliezer Rabinovici, Stefano Bolghesi and Shubho Roy **On Some Universal Features of the Holographic Quantum Complexity of Bulk Singularities**

TEACHING

Assistant Professor, IIT Hyderabad

since March 2016

- **Gravitation and Cosmology (PH 6458/4258)** offered to beginning PhD students, second year postgraduate (M.Sc) and final year B.Tech students at Department of Physics. (Spring & Fall 2017)
- **Electromagnetism and Maxwell's Equations (PH 1027)** offered to freshman/first year B.Tech students from all departments. (Spring 2017)
- **Classical Field Theory (PH 6297)** offered to second year postgraduate (M.Sc) and final year B.Tech students at Department of Physics. (Fall 2016 & Spring 2017)
- **Introduction to General Relativity (PH 6887/3887)** offered to second year postgraduate (M.Sc) and advanced Engineering Physics B.Tech students at Department of Physics. (Fall & Spring 2016)

Adjunct Assistant Professor, Lehman Coll. of CUNY

Fall 2010

- Part of **Introductory Physics 166** and **Physics 168** instructional team at Lehman College, CUNY.
- Led weekly laboratory sessions.

SCHOOLS AND
CONFERENCES

The Institut d't of the LPTENS, August 19-28, 2015, Paris, France

deSitter and Microstates Landscapes in String Theory, June 16-19, 2015, IPhT, CEA-Saclay, Paris, France

32nd Winter School in Theoretical Physics (100 Years of General Relativity: From Theory to Experiment and Back), Dec 29 - Jan 8, 2015, Jerusalem, Israel

US-India Advanced Studies Institute on Thermalization: From Glasses to Black Holes, June 2013 Bangalore, India

Non-perturbative gauge theories, holography and all that, January 2013, Bangalore, India

Indian Strings Meeting 2012, Puri, India

Strings 2011, Uppsala, Sweden

Workshop on Holographic Cosmology, Department of Physics, McGill University, Montreal, Canada

Quantum Theory and Symmetries Department of Physics and Astronomy, University of Kentucky, Lexington, KY USA

New England String Meeting, 2010, 2008, 2007 (Fall and Spring) Brown University, Providence, RI USA

9th Northeast String Cosmology Meeting ISCAP, Columbia University, New York, NJ USA

Prospects in Theoretical Physics (PITP) 2006 IAS, Princeton, NJ USA

INVITED TALKS

Theory Seminar, Theory Division of Saha Institute of Nuclear Physics (SINP), Kolkata, India **“Holographic (CFT) reconstruction of local asymptotically AdS space-time”**, June 13, 2017

Talk at **“Strings Attached”** International Workshop on String Theory and Related Topics at IIT Kanpur from Feb 20-23, 2017, Indian Institute of Technology, Kanpur (IITK), India **“Computational Complexity and Cosmological Singularities”**, Feb. 21, 2017

Seminar at Institute of Physics, Bhubaneswar (IOPB), **“Computational Complexity and Cosmological Singularities”**, July 12, 2016.

Particle and Fields Seminar, Ben Gurion University, Beersheba, Israel **“A hologram for pure state AdS black holes”** May 4, 2015

Hebrew University, Jerusalem, Israel and Humboldt University, Berlin, Germany meeting in Jerusalem on Gravitation and High Energy Physics, **“Holograms of pure state black holes”** March 22-23, 2015

Quantum Universe ICORE meeting, Tel Aviv University **“Black hole formation in Matrix Models”** Mar. 1, 2015

High Energy Theory Group Seminar, Hebrew University, **“Resolution of cosmological singularities in Higher Spin Theory”** Nov. 12, 2014

Journal Club Seminar, Department of Particle Physics, Tel Aviv University, Tel Aviv, Israel **“Resolution of cosmological singularities in Higher Spin Theory”** Nov. 6, 2014

Theory Seminar, Theory Division of Saha Institute of Nuclear Physics (SINP), Kolkata, India **“Resolution of cosmological singularities in Higher Spin Theory”** Sept. 24, 2014

String Theory and Mathematical Physics Seminar (STMP), Department of Theoretical Physics (DTP), Tata Institute of Fundamental Research (TIFR), Mumbai, India **“Resolution of cosmological singularities in Higher Spin Theory”** Sept. 15, 2014

Theory Seminar, International Center for Theoretical Physics (ICTS-TIFR), Bangalore, India **“Holographic bulk reconstruction, beyond (super)gravity”** Sept. 11, 2014

In House Symposium 2013, Center for High Energy Physics, IISc, **“Black Hole Formation in a Fuzzy Sphere Collapse”** (Nov. 2, 2013)

Math-Phys Journal Club, Center for High Energy Physics, IISc, **“Black Hole Formation at the Correspondence Point”**, (April 10, 2013)

Math-Phys Journal Club Seminar, Center for High Energy Physics, IISc, **“Holographic presentation of local physics in AdS (part II) : Maxwell fields and Gravitons”** (Nov. 21, 2012)

In House Symposium 2012, Center for High Energy Physics, IISc, **“Thermalization in BFSS matrix model and dual M-theory black holes”** (Nov. 16, 2012)

Math-Phys Journal Club Seminar, Center for High Energy Physics, IISc, **“Holographic presentation of local physics in AdS (part I)”** (Nov. 14, 2012)

High Energy Theory Special Seminar, City College of New York, City University of New York, **“Holographic Cosmology”** (Nov. 23, 2009)