Raghav Govind Jha

rgjha.github.io +1 519-570-7150 rjha1@perimeterinstitute.ca, raghav.govind.jha@gmail.com
227, Perimeter Institute for Theoretical Physics, Waterloo, Ontario N2L 2Y5, Canada
iNSPIRE-HEP, ORCID : 0000-0003-2933-0102
Date of Birth : January 23, 1989 Citizenship : Indian

Employment

September 2019 -	Postdoctoral Fellow, Perimeter Institute for Theoretical Physics, Canada

Education

2013 – 2019	Ph.D. Physics, Syracuse University, Syracuse, New York, USA
	Thesis : Holography, large N, and supersymmetry on the lattice
2011 – 2013	M.Sc. Physics, St. Xavier's College & Bose Institute, Kolkata, India
2010 – 2011	M.S. in Nanomaterials, UPMC, University of Paris 6, Paris, France
2007 – 2010	B.Sc. Physics (Honours), St. Stephen's College Delhi, India

Publications and preprints

Citations : 100+, h-index : 7

1. Tensor renormalization group study of the 3d O(2) model [2105.08066]
2. Three-dimensional super-Yang–Mills theory on the lattice and dual black branes [Phys. Rev. D 102, 106009 (2020)] [2010.00026]
3. Positive geometries for all scalar theories from twisted intersection theory [Phys. Rev. Research 2, 033119 (2020)] [2006.15359]
4. Critical analysis of two-dimensional classical XY model [J. Stat. Mech. (2020) 083203] [2004.06314]
5. Thermal phase structure of a supersymmetric matrix model [PoS LATTICE2019 (2020) 069] [2003.01298]
6. Finite N unitary matrix models [2003.00341]
7. Tensor renormalization group study of the non-Abelian Higgs model in two dimensions [Phys. Rev. D 99, 114507 (2019)] [1901.11443]
8. Lattice quantum gravity with scalar fields [PoS LATTICE2018 (2019) 043] [1810.09946]
9. The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality [PoS LATTICE2018 (2019) 308] [1809.00797]
10. Removal of the trace mode in lattice $\mathcal{N} = 4$ super Yang-Mills theory [Phys. Rev. D 98, 095017 (2018)] [1808.04735]
11. Nonperturbative study of dynamical SUSY breaking in $\mathcal{N} = (2, 2)$ Yang-Mills [Phys. Rev. D 97, 054504 (2018)] [1801.00012]
12. Truncation of lattice $\mathcal{N} = 4$ super Yang-Mills [EPJ Web of Conferences 175, 11008 (2018)]

13. Testing the holographic principle using lattice simulations [EPJ Web of Conferences 175, 08004 (2018)] [1710.06398]
14. Testing holography using lattice super-Yang-Mills on a 2-torus [Phys. Rev. D 97, 086020 (2018)] [1709.07025]

Talks & Posters

Invited Talks/Seminars/School Lectures [13]

- Solving matrix models at large and finite N (June 28 and 29, 2021) - Two lectures for Summer School 2021 at Rensselaer Polytechnic Institute, USA [Online due to COVID-19 pandemic] [Lecture 1 & 2]
- Holographic gauge theories on the lattice at (June 23, 2021) [Online] at Dublin Institute for Advanced Studies, Dublin [Slides(PDF)] [Video (YouTube)]
- Old and new methods for new and old problems in Physics (March 8, 2021) [Online] at Indian Institute of Technology (IIT) Madras [Slides(PDF)]
- Probing holographic dualities with lattice supersymmetric Yang-Mills theories (February 25, 2021) [Online] at Massachusetts Institute of Technology [Slides(PDF)] [Video (YouTube)]
- New tool for old problems - Tensor network approach to spin models and gauge theories (October 14, 2020) [Online] at University of Liverpool, UK [Slides(PDF)]
- Tensor Networks : Algorithm & Applications (June 10 and 11, 2020) - Two lectures for CyberTraining Summer School 2020 at Rensselaer Polytechnic Institute, USA [Online due to COVID-19 pandemic] [Lecture 1 & 2]
- Numerical Approaches to Holography (August 28, 2019) at Ashoka University, Haryana, Sonepat, India [Slides(PDF)]
- Numerical Approaches to Holography (August 8, 2019) at Indian Institute of Science Education and Research (IISER) Mohali, India
- Holographic dualities and tensor renormalization group study of gauge theories (March 11, 2019) at Perimeter Institute, Waterloo, Canada [Video (PIRSA)]
- Supersymmetry breaking and gauge/gravity duality on the lattice (April 6, 2018) at UC Boulder, Colorado, USA [Slides(PDF)]
- Recent results from lattice supersymmetry in $2 \leqslant d < 4$ dimensions (January 31, 2018) at ICTS, Bangalore, India [Video (YouTube)]
- Testing holography through lattice simulations (April 4, 2017) at Yukawa Institute for Theoretical Physics, Kyoto, Japan [PDF]
- Supersymmetry on the lattice (April 17, 2016) at April Meeting 2016 - Salt Lake City, Utah, USA [Slides(PDF)]

Contributed Talks [2]

- Testing holographic principle through lattice studies (June 22, 2017) at Lattice 2017, Granada, Spain
- Lattice quantum gravity with scalar fields (July 23, 2018) at Lattice 2018, East Lansing, Michigan, USA

Posters [1]

- The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality at Lattice 2018 (36^{th} Annual International Symposium on Lattice Field Theory) 24 July 2018

Teaching Experience

- Recitation Instructor for PHY 216 (General Physics II for Honors and Majors) and Grader for PHY 662 (Quantum Mechanics II) Spring 2019
- Recitation Instructor for PHY 215 (General Physics I for Honors and Majors) and Grader for PHY 312 (Relativity & Cosmology) 2018

- Grader for PHY 424 (Electromagnetism) and PHY 360 (Waves and Oscillations) Fall 2016
- Recitation Instructor for PHY 212 General Physics II Spring 2016
- Grader for PHY 641 (Statistical Mechanics) and PHY 731 (Electromagnetic theory) 2015
- Recitation Instructor for PHY 211 General Physics I 2014
- Lab Instructor for General PHY 101 Fall 2013

Academic Achievements

- Henry Levinstein Fellowship for Outstanding Senior Graduate Student - Department of Physics, Syracuse University [USD 2000] 2017
- College of Arts and Sciences Fellowship for best performance in introductory Graduate Courses - Syracuse University [USD 1700] 2014
- CSIR/UGC-NET - Junior Research Fellowship (JRF) by Government of India March 2013
- Erasmus Mundus Scholarship for pursuing M.S at UPMC, University of Paris VI [EUR 12000] 2010
- National Top 25 Students (out of 5153 students) in National Graduate Physics Examination (NGPE) 2009
- KVPY (Kishore Vaigyanik Protsahan Yojana) Scholarship by Department of Science & Technology, Government of India [about USD 3500 in two years] 2008
- Merit certificate by University of Delhi (11^{th} in the university out of $\approx$ 1200 students) 2008
- NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute (TIFR), Mumbai 2008

Computer Skills

C/C++, Python, Julia, Matlab, Mathematica, LaTeX, and Bash

Professional Services and Grants

- Quantum Fields and Strings Seminar Organizer at Perimeter Institute [January 2020 - March 2021].
- Referee for Physical Review D and Physical Review Letters
- Co-wrote USQCD computing grants in 2017 and 2018 and was awarded $\approx$ 12M core-hours on Fermilab pi0 machine each year.

Mentorship Experience

- Nikhil Kalyanapuram (PSI student at Perimeter Institute, now PhD candidate at Penn State) 2019-2020
- Navdeep Dhindsa (PhD student at IISER Mohali) 2020-
- Vamika Longia (PhD student at IISER Mohali) 2021-

Work in progress (excluding Conference proceedings)

- Phase structure of BMN matrix model at finite couplings [with A. Joseph and D. Schaich]
- Towards exact result of two-dimensional Ising model in a magnetic field [single author]
- Scalar bound states in $\mathcal{N} = (2, 2)$ SYM at large N and finite temperatures [with A. Joseph, D. Schaich, N. Dhindsa]
- Parallel software for large N supersymmetric gauge theories [with D. Schaich et al.]
- Improved tensor contraction for three-dimensional spin models [single author]

References

1. Simon Catterall (PhD thesis advisor)
   Professor of Physics and Department Associate Chair
   Syracuse University, NY, USA
   smcatter@syr.edu

2. Toby Wiseman
   Professor of Theoretical Physics
   Imperial College, London, UK
   t.wiseman@imperial.ac.uk

3. Joel Giedt
   Associate Professor and Associate Department Head
   Rensselaer Polytechnic Institute Troy, NY, USA
   giedtj@rpi.edu

4. David Schaich
   Lecturer in Theoretical Particle Physics, Department of Mathematical Sciences
   University of Liverpool, Liverpool, UK
   david.schaich@liverpool.ac.uk

5. A. P. Balachandran
   Emeritus Professor of Physics
   Syracuse University, NY, USA
   balachandran38@gmail.com

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