





Raghav Govind JHA

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iNSPIRE-HEP, ORCID: [0000-0003-2933-0102](https://orcid.org/0000-0003-2933-0102)

 Date of Birth: January 23, 1989 Citizenship: Indian

Employment

from September 2022	Postdoctoral Researcher, Thomas Jefferson National Accelerator Facility (JLab), VA, USA
2019 - 2022	Postdoctoral Fellow, Perimeter Institute for Theoretical Physics, Canada

Education

2013 – 2019	Ph.D. Physics , <i>Syracuse University</i> , Syracuse, New York, USA Thesis: Holography, large N, and supersymmetry on the lattice defended on April 2, 2019
2011 – 2013	M.Sc. Physics , <i>St. Xavier's College & Bose Institute</i> , Kolkata, India
2010 – 2011	M.S. in Nanomaterials , <i>Sorbonne Université</i> , Paris, France ¹
2007 – 2010	B.Sc. Physics (Honours) , <i>St. Stephen's College</i> , Delhi, India

Publications and preprints (Authors are mostly listed in alphabetical order)

Total citations² (as per iNSPIRE HEP): 175, h-index: 8

1. Non-perturbative phase structure of the bosonic BMN matrix model
[arXiv:2201.08791](#), *JHEP* 05 (2022) 169
N. S. Dhindsa, R. G. Jha, A. Samlodia, A. Joseph, and D. Schaich
2. Thermal phase structure of dimensionally reduced super-Yang–Mills
[arXiv:2201.03097](#)
D. Schaich, R. G. Jha, A. Joseph
3. Tensor renormalization of three-dimensional Potts model
[arXiv:2201.01789](#)
R. G. Jha
4. Introduction to Monte Carlo for Matrix Models
[arXiv:2111.02410](#), *SciPost Phys. Lect. Notes* 46 (2022)
R. G. Jha
5. Large-N limit of two-dimensional Yang–Mills theory with four supercharges
[arXiv:2109.01001](#)
N. S. Dhindsa, R. G. Jha, A. Joseph, and D. Schaich
6. Tensor renormalization group study of the 3d O(2) model
[arXiv:2105.08066](#), *Phys. Rev. D* 104, 094517 (2021)
J. Bloch, R. G. Jha, R. Lohmayer, M. Meister

1. Before 2017, it was called UPMC Paris VI

2. For paper-wise citation, please refer to iNSPIRE

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7. Three-dimensional super-Yang–Mills theory on the lattice and dual black branes
[arXiv:2010.00026](#), *Phys. Rev. D* **102**, 106009 (2020)
S. Catterall, J. Giedt, R. G. Jha, D. Schaich, T. Wiseman
 8. Positive geometries for all scalar theories from twisted intersection theory
[arXiv:2006.15359](#), *Phys. Rev. Research* **2**, 033119 (2020)
R. G. Jha, N. Kalyanapuram
 9. Critical analysis of two-dimensional classical XY model
[arXiv:2004.06314](#), *J. Stat. Mech.* (2020) 083203
R. G. Jha
 10. Thermal phase structure of a supersymmetric matrix model
[arXiv:2003.01298](#), *PoS LATTICE2019* (2020) 069
D. Schaich, R. G. Jha, A. Joseph
 11. Finite N unitary matrix models
[arXiv:2003.00341](#)
R. G. Jha
 12. Tensor renormalization group study of the non-Abelian Higgs model in two dimensions
[arXiv:1901.11443](#), *Phys. Rev. D* **99**, 114507 (2019)
A. Bazavov, S. Catterall, R. G. Jha, J. U-Yockey
 13. Lattice quantum gravity with scalar fields
[arXiv:1810.09946](#), *PoS LATTICE2018* (2019) 043
R. G. Jha, J. Laiho, J. U-Yockey
 14. The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality
[arXiv:1809.00797](#), *PoS LATTICE2018* (2019) 308
R. G. Jha
 15. Removal of the trace mode in lattice $\mathcal{N} = 4$ super Yang-Mills theory
[arXiv:1808.04735](#), *Phys. Rev. D* **98**, 095017 (2018)
S. Catterall, J. Giedt, R. G. Jha
 16. Nonperturbative study of dynamical SUSY breaking in $\mathcal{N} = (2, 2)$ Yang-Mills
[arXiv:1801.00012](#), *Phys. Rev. D* **97**, 054504 (2018)
S. Catterall, R. G. Jha, A. Joseph
 17. Truncation of lattice $\mathcal{N} = 4$ super Yang-Mills
EPJ Web of Conferences **175**, 11008 (2018)
S. Catterall, J. Giedt, R. G. Jha
 18. Testing the holographic principle using lattice simulations
[arXiv:1710.06398](#), *EPJ Web of Conferences* **175**, 08004 (2018)
R. G. Jha, S. Catterall, D. Schaich, T. Wiseman
 19. Testing holography using lattice super-Yang-Mills on a 2-torus
[arXiv:1709.07025](#), *Phys. Rev. D* **97**, 086020 (2018)
S. Catterall, R. G. Jha, D. Schaich, T. Wiseman

Talks and Posters

Invited Talks/Seminars/School Lectures [21]

- › Some old problems on the lattice using tensors (August 26, 2022) at ICTS, Bangalore, India [[Video \(YouTube\)](#)]
- › Introduction to Quantum Computation using QISKIT (June 22 and 23, 2022) - Two lectures for Summer School 2022 at Rensselaer Polytechnic Institute, USA [Online] [[Lecture 1 & 2](#)]
- › New approach to continuous spin models in two and three dimensions (May 17, 2022) at Numerical Methods in Theoretical Physics conference, APCTP, Pohang, South Korea [Online] [[Slides\(PDF\)](#)]
- › Holography with large matrices on the lattice (March 24, 2022) at Institute of Nuclear Sciences, Universidad Nacional Autónoma de México, Mexico City, Mexico [[Slides\(PDF\)](#)]
- › Large N matrix models using Monte Carlo and Bootstrap (February 22, 2022) at University of Surrey, Surrey, UK [Online] [[Slides\(PDF\)](#)]
- › Introduction to tensor networks and spin systems (January 11, 2022) at Azim Premji University, Bengaluru, India
- › Tensor networks and spin models (December 7, 2021) at Indian Institute of Science Education and Research (IISER), Mohali, India [[Slides\(PDF\)](#)]
- › Real-space tensor renormalization for spin models in three dimensions (November 19, 2021) at Perimeter Institute, Waterloo, Canada
- › 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] [[Lecture 1 & 2](#)]
- › Holographic gauge theories on the lattice at (June 23, 2021) [Online] at Dublin Institute for Advanced Studies, Dublin, Ireland [[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, India [[Slides\(PDF\)](#)]
- › Probing holographic dualities with lattice supersymmetric Yang-Mills theories (February 25, 2021) [Online] at Massachusetts Institute of Technology, Boston, USA [[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, 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, Sonapat, 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 $2 \leq d < 4$ 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 [[Slides\(PDF\)](#)]
- › Supersymmetry on the lattice (April 17, 2016) at April Meeting 2016 - Salt Lake City, Utah, USA [[Slides\(PDF\)](#)]

Contributed Talks and Posters [3]

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

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 PHY 101 General Physics Fall 2013

Academic Awards

- › 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 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) conducted by Indian Association of Physics Teachers (IAPT) 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 (11th in the university out of \approx 1200 students) 2008
- › NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute of Fundamental Research (TIFR), Mumbai 2008

Computer Skills

- › Classical: C/C++, Python, Julia, Matlab, Mathematica, \LaTeX , and Bash
- › Quantum: QisKit (IBM), Cirq (Google)

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 (since 2020), European Physical Journal (EPJ) (since 2022), Machine Learning: Science and Technology (an IOP Journal) (since 2021)
- › Awarded DiRAC computing grant in 2022 for \approx 24M core-hours

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- › Awarded USQCD computing grants of $\approx 12\text{M}$ core-hours on Fermilab pi0 machine each year in 2017 & 2018.












Mentorship Experience

- › Nikhil Kalyanapuram (Perimeter Scholar International (PSI) student at Perimeter Institute, now PhD candidate at Penn State) 2019-2020
- › Navdeep Singh Dhindsa (PhD student at IISER Mohali) 2020-
- › Abhishek Samlodia (BS-MS student at IISER Mohali, now PhD candidate at Syracuse University) 2021-
- › Nikhil Bansal (BS-MS student at IISER Mohali) 2022-

Work in progress

- › Scattering in Ising Field Theory using Matrix Product States (MPS) [Expected in 2022]
- › Phase transition in $\mathcal{N} = (2, 2)$ SYM at large N and finite temperatures [Expected in 2022]
- › Nonperturbative study of BMN matrix model at finite couplings at large N [Expected in 2022]
- › Tensor renormalization group approach to generalized XY model [Expected in 2022 or 2023]
- › Parallel software for large N supersymmetric gauge theories [Expected in 2023]

References

1. Simon Catterall - Professor of Physics, Syracuse University, NY, USA
 smcatter@syr.edu  +13154435978
2. Toby Wiseman - Professor of Theoretical Physics, Imperial College, London, UK
 t.wiseman@imperial.ac.uk  +442075947832
3. Pedro Vieira - Faculty at Perimeter Institute, Waterloo, Canada and ICTP-SAIFR, São Paulo, Brazil
 pedrovgvieira@gmail.com  +15195697600 (8611)
4. Joel Giedt - Associate Professor, Rensselaer Polytechnic Institute, Troy, NY, USA
 giedtj@rpi.edu  +15182766455
5. David Schaich - Lecturer in Theoretical Particle Physics, University of Liverpool, Liverpool, UK
 david.schaich@liverpool.ac.uk  +447568168895
6. A. P. Balachandran - Emeritus Professor of Physics, Syracuse University, NY, USA
 balachandran38@gmail.com

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