



Raghav Govind JHA

 [rgjha.github.io](https://github.com/rgjha)  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

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| September 2019 - August 2022 | Postdoctoral Fellow, Perimeter Institute for Theoretical Physics, Canada |
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Education

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| 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, Université Pierre et Marie Curie (UPMC Paris VI) Paris, France |
| 2007 – 2010 | B.Sc. Physics (Honours), St. Stephen's College, Delhi, India |

Publications and preprints

Citations (as per iNSPIRE) : 140, h-index : 7

1. Non-perturbative phase structure of the bosonic BMN matrix model [[arXiv:2201.08791](#)]
2. Thermal phase structure of dimensionally reduced super-Yang–Mills [[arXiv:2201.03097](#)]
3. Tensor renormalization of three-dimensional Potts model [[arXiv:2201.01789](#)]
4. Introduction to Monte Carlo for Matrix Models [[arXiv:2111.02410](#)]
5. Large-N limit of two-dimensional Yang–Mills theory with four supercharges [[arXiv:2109.01001](#)]
6. Tensor renormalization group study of the 3d O(2) model [Phys. Rev. D 104, 094517 (2021)] [[arXiv:2105.08066](#)]
7. Three-dimensional super-Yang–Mills theory on the lattice and dual black branes [Phys. Rev. D 102, 106009 (2020)] [[arXiv:2010.00026](#)]
8. Positive geometries for all scalar theories from twisted intersection theory [Phys. Rev. Research 2, 033119 (2020)] [[arXiv:2006.15359](#)]
9. Critical analysis of two-dimensional classical XY model [J. Stat. Mech. (2020) 083203] [[arXiv:2004.06314](#)]
10. Thermal phase structure of a supersymmetric matrix model [PoS LATTICE2019 (2020) 069] [[arXiv:2003.01298](#)]
11. Finite N unitary matrix models [[arXiv:2003.00341](#)]
12. Tensor renormalization group study of the non-Abelian Higgs model in two dimensions [Phys. Rev. D 99, 114507 (2019)] [[arXiv:1901.11443](#)]
13. Lattice quantum gravity with scalar fields [PoS LATTICE2018 (2019) 043] [[arXiv:1810.09946](#)]

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14. The properties of D1-branes from lattice super Yang–Mills theory using gauge/gravity duality [PoS LATTICE2018 (2019) 308] [[arXiv:1809.00797](#)]
 15. Removal of the trace mode in lattice $\mathcal{N} = 4$ super Yang–Mills theory [Phys. Rev. D 98, 095017 (2018)] [[arXiv:1808.04735](#)]
 16. Nonperturbative study of dynamical SUSY breaking in $\mathcal{N} = (2, 2)$ Yang–Mills [Phys. Rev. D 97, 054504 (2018)] [[arXiv:1801.00012](#)]
 17. Truncation of lattice $\mathcal{N} = 4$ super Yang–Mills [EPJ Web of Conferences 175, 11008 (2018)]
 18. Testing the holographic principle using lattice simulations [EPJ Web of Conferences 175, 08004 (2018)] [[arXiv:1710.06398](#)]
 19. Testing holography using lattice super-Yang–Mills on a 2-torus [Phys. Rev. D 97, 086020 (2018)] [[arXiv:1709.07025](#)]

Talks & Posters

Invited Talks/Seminars/School Lectures [16]

- › 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, 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 [[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, 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 \(YouTube\)](#)]

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- › 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

Poster [1]

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

Teaching Experience

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- › 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 Achievements

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- › 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) 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 ≈ 1200 students) 2008
 - › NIUS (National Initiative on Undergraduate Sciences) Fellowship by Tata Institute of Fundamental Research (TIFR), Mumbai 2008

Computer Skills

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- › Classical : C/C++, Python, Julia, Matlab, Mathematica, L^AT_EX, 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), and Machine Learning : Science and Technology (an IOP Journal) (since 2021)
- › Awarded USQCD computing grants of $\approx 12\text{M}$ core-hours on Fermilab pi0 machine each year in 2017 & 2018.












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

- › Inelastic scattering in Ising Field Theory [Expected in Summer 2022]
- › Phase structure of BMN matrix model at finite couplings at large N [Expected in Summer 2022]
- › Scalar bound states in $\mathcal{N} = (2, 2)$ SYM at large N and finite temperatures [Expected in Summer 2022]
- › Parallel software for large N supersymmetric gauge theories [Expected in 2022 or early 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
 pedrogvieira@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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