Raghav Govind JHA

rgjha.github.io +91 89290 65489 raghav.govind.jha@gmail.com
iNSPIRE-HEP, ORCID: 0000-0003-2933-0102
Date of Birth: January 23, 1989 Citizenship: Indian

Employment

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

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

Total citations [2] (as per iNSPIRE HEP): 177, 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 $3\mathrm{d}$ $\mathrm{O}(2)$ 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

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 $\mathrm{D}1$-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

1. Some old problems on the lattice using tensors (August 26, 2022) at ICTS, Bangalore, India during NUM-STRINGS 2022 conference [YouTube]
2. 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]
3. 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)]
4. 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)]
5. Large N matrix models using Monte Carlo and Bootstrap (February 22, 2022) at University of Surrey, Surrey, UK [Online] [Slides(PDF)]
6. Introduction to tensor networks and spin systems (January 11, 2022) at Azim Premji University, Bengaluru, India
7. Tensor networks and spin models (December 7, 2021) at Indian Institute of Science Education and Research (IISER), Mohali, India [Slides(PDF)]
8. Real-space tensor renormalization for spin models in three dimensions (November 19, 2021) at Perimeter Institute, Waterloo, Canada
9. 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]
10. Holographic gauge theories on the lattice at (June 23, 2021) [Online] at Dublin Institute for Advanced Studies, Dublin, Ireland [Slides(PDF)] [Video (YouTube)]
11. 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)]
12. Probing holographic dualities with lattice supersymmetric Yang-Mills theories (February 25, 2021) [Online] at Massachusetts Institute of Technology, Boston, USA [Slides(PDF)] [Video (YouTube)]
13. 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)]
14. 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]
15. Numerical Approaches to Holography (August 28, 2019) at Ashoka University, Sonepat, India [Slides(PDF)]
16. Numerical Approaches to Holography (August 8, 2019) at Indian Institute of Science Education and Research (IISER) Mohali, India
17. Holographic dualities and tensor renormalization group study of gauge theories (March 11, 2019) at Perimeter Institute, Waterloo, Canada [Video (PIRSA)]
18. Supersymmetry breaking and gauge/gravity duality on the lattice (April 6, 2018) at UC Boulder, Colorado, USA [Slides(PDF)]

19. Recent results from lattice supersymmetry in $2 \leqslant d < 4$ dimensions (January 31, 2018) at ICTS, Bangalore, India [Video (YouTube)]
20. Testing holography through lattice simulations (April 4, 2017) at Yukawa Institute for Theoretical Physics, Kyoto, Japan [Slides(PDF)]
21. Supersymmetry on the lattice (April 17, 2016) at April Meeting 2016 - Salt Lake City, Utah, USA [Slides(PDF)]

Contributed Talks and Posters

1. Testing holographic principle through lattice studies (June 22, 2017) at Lattice 2017, Granada, Spain
2. Lattice quantum gravity with scalar fields (July 23, 2018) at Lattice 2018, East Lansing, Michigan, USA
3. The properties of $\mathrm{D}1$-branes from lattice super Yang–Mills theory using gauge/gravity duality (24 July 2018) at Lattice 2018, 36$^{\text{th}}$ 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 (11$^{\text{th}}$ 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
› Awarded USQCD computing grants of $\approx$ 12M 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 structure of BMN matrix model at finite couplings at large N [Expected in 2022]
› Scalar bound states in $\mathcal{N} = (2, 2)$ SYM at large N and finite temperatures [Expected in 2022]
› Parallel software for large N supersymmetric gauge theories [Expected in 2022 or Spring 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

Last updated: 07 September 2022