Raghav Govind JHA

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Date of Birth: January 23, 1989 Citizenship: Indian

Employment

September 2019 - August 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
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 (Authors are mostly listed in alphabetical order)

Citations (as per iNSPIRE database): 155, h-index: 7

1. Non-perturbative phase structure of the bosonic BMN matrix model
   arXiv:2201.08791 (to be published in JHEP)
   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 (To be published in SciPost Lecture Notes)
   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

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 [18]

- 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, 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 [**Slides(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 (24 July 2018) at Lattice 2018, 36th Annual International Symposium on Lattice Field Theory

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 ≈ 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), and Machine Learning: Science and Technology (an IOP Journal) (since 2021)

› Awarded USQCD computing grants of ≈ 12M 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-
- Abhishek Samlodia (BS-MS student at IISER Mohali) 2021-

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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