



# SUBHAYAN SAHU

(he/him)

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I am a postdoctoral researcher at the Perimeter Institute of Theoretical Physics. I study the structure and dynamics of information in quantum many-body systems.

## EXPERIENCE

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Sep, 2022 - **Perimeter Institute**  
Postdoctoral Researcher

## EDUCATION

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2017-2022 **University of Maryland, College Park**  
Doctor of Philosophy, Department of Physics | GPA 4.0/4.0  
Advisor: [Dr. Brian Swingle](#)

2013-17 **Indian Institute of Science, Bangalore**  
Bachelor of Science (Research)  
Major: Physics | CGPA 7.7/8.0 | Graduated top of class

## PREPRINTS / PUBLICATIONS

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\*Equal contribution

9. Charge transport, information scrambling and quantum operator-coherence in a many-body system with U(1) symmetry

*Lakshya Agarwal, Subhayan Sahu, Shenglong Xu. [ArXiv:2210.14828](#).*

8. Efficient tensor network simulation of quantum many-body physics on sparse graphs

*Subhayan Sahu, Brian Swingle. [ArXiv:2206.04701](#).*

7. Entanglement Phases in large-N hybrid Brownian circuits with long-range couplings

*Subhayan Sahu\**, *Shao-Kai Jian\**, *Gregory Bentsen, Brian Swingle. [ArXiv:2109.00013](#).*

6. Measurement-induced purification in large-N hybrid Brownian circuits

*Gregory Bentsen\**, *Subhayan Sahu\**, *Brian Swingle. [Phys. Rev. B 104, 094304 \(2021\)](#), [ArXiv:2104.07688](#).*

5. Information scrambling at finite temperature in local quantum systems

*Subhayan Sahu, Brian Swingle. [Phys. Rev. B 102, 184303 \(2020\)](#), **Editors' Suggestion**, [ArXiv:2005.10814](#).*

4. Many body localization due to correlated disorder in Fock space

*Soumi Ghosh, Atithi Acharya, Subhayan Sahu, Subroto Mukerjee. [Phys. Rev. B 99, 165131 \(2019\)](#), [ArXiv:1901.04384](#).*

3. Scrambling dynamics across a thermalization-localization quantum phase transition

*Subhayan Sahu, Shenglong Xu, Brian Swingle. [Phys. Rev. Lett. 123, 165902 \(2019\)](#), [ArXiv:1807.06086](#).*

2. The lengthening pendulum: Adiabatic invariance and bursting solutions  
*Subhayan Sahu, Shriya Pai, Naren Manjunath, Janaki Balakrishnan . Physics Open, Volume 7, 2021.*

1. Maximal entanglement and state transfer using Arthurs-Kelly interaction for qubits  
*Subhayan Sahu, S.M. Roy. Eur. Phys. J. D (2018) 72: 211, ArXiv:1612.03405.*

## TALKS AND POSTERS

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\*Invited talks

6. Measurement-induced entanglement transition in large-N solvable quantum circuits

\* Indian Institute of Science Physics seminar, *Jan 2023, Indian Institute of Science*

5. Tensor networks on sparse graphs

- David Gosset group meeting, *Dec 2022, Institute for Quantum Computing, University of Waterloo*
- Quantum Matter Journal Club, *Oct 2022, Perimeter Institute*
- CMTC graduate student symposium, *Jun 2022, University of Maryland*

4. Large-N solvable models of measurement-induced criticality

- MPIPES conference: Probing Complex Quantum Dynamics (Poster), *Oct 2021, MPIPES*
- JQI/QuICS/CMTC seminar, *Oct 2021, University of Maryland*
- \* Invited seminar at Perimeter Institute, *Nov 2021, Perimeter Institute*

3. Measurement-induced purification in large-N hybrid Brownian circuits

- APS March Meeting 2021 (Contributed talk), *Mar 2021, virtual*
- JQI/QuICS/CMTC seminar, *April 2021, University of Maryland*

2. Quantum Information Scrambling in gapped local systems at finite temperature

- PhD Candidacy talk, *Jun 2020, CMTC, University of Maryland*
- APS March Meeting 2020 (Contributed talk), *Mar 2020, Denver (cancelled)*
- \* Indian Institute of Science Physics seminar, *Jan 2020, Indian Institute of Science*

1. Scrambling dynamics across a thermalization-localization quantum phase transition

- Les Houches Summer School (Poster), *Aug 2019, Ecole de Physique des Houches*
- JQI/QuICS/CMTC seminar, *March 2019, University of Maryland*
- APS March Meeting 2019 (Contributed talk), *March 2019, Boston*

## SCHOOLS AND CONFERENCES

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Mar 2022 **APS March Meeting, Chicago, USA**

Oct 2021 **PROTOC21, MPIPES**, Conference on 'Probing Complex Quantum Dynamics through Out-of-time-ordered Correlators'

Mar 2021 **APS March Meeting, online**

Aug 2020 **Online Ultra-Quantum Matter Summer School**

Aug 2019 **Les Houches Summer School**, Ecole des Physique des Houches. Topic: Dynamics and Disorder in Quantum Many Body Systems far from Equilibrium

Mar 2019 **APS March Meeting, Boston, USA**

May 2018 Quantum Leaps: Quantum information in quantum many body physics, Columbia University

Jul 2017 **Bangalore School of Statistical Physics VIII**

Aug 2014 **Asian Science Camp (2014)**: Part of Indian delegate to the camp held in NTU, Singapore.

Jun 2014 **NIUS Physics Camp (2014)**, held at HBCSE, TIFR, Mumbai.

Dec 2012 **Vijyoshi Camp (2012)**, held at IISc, Bangalore.

## ACADEMIC HIGHLIGHTS

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- 2021 **Best TA award** from the Department of Physics, University of Maryland, for Spring and Fall '21.
- 2017-19 **Dean's fellowship** from the University of Maryland, College Park
- 2017 Graduated top of class of Physics majors; received **Institute Gold medal for Physics** from Indian Institute of Science
- 2016 **DAAD WISE Fellowship**: Recipient of the DAAD scholarship for 3 month internship in Universität Siegen, Germany
- 2012-17 **Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship**: scholarship awarded by the Department of Science and Technology, Government of India
- 2014 Participated in **ASIAN SCIENCE CAMP**, as part of the Indian delegate of 20 students

## TEACHING

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- Fall '21 TA for Undergraduate Electrodynamics and Sophomore general physics  
**Best TA Award**
- Summer '21 Prepared a packet on Tensor Network for high-schoolers for **Girls Talk Math - UMD**
- Spring '21 TA for Graduate Quantum Mechanics II and Graduate Statistical Mechanics at UMD  
**Best TA Award**
- Fall '17 TA for Phys 260: Vibrations, Waves, Heat, Electricity and Magnetism at UMD

## UNDERGRADUATE RESEARCH EXPERIENCE

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- 2016-17 | Many body localization from dynamics in Fock space  
IISc | Advisor: [Dr. Subroto Mukerjee](#)  
(Undergraduate thesis)
- 2015-16 | Maximal entanglement generation in Arthurs Kelly type interaction  
HBCSE (TIFR) | Advisor: [Dr. Shasanka Mohan Roy](#)
- 2016 | Entanglement detection in CV using local orthogonal observables  
Universität Siegen, | Advisor: [Dr. Otfried Gühne](#)  
Germany | Research visit supported by DAAD fellowship.

## SKILLS

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**Computing** Python, Matlab, Julia, Mathematica,  $\LaTeX$ , basic Shell

## PROFESSIONAL SERVICE

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Reviewer for Phys. Rev. Lett., SciPost Physics, Phys. Rev. B.