Faizan Bhat

📍 Bangalore, India   ✉ faizanbhat@iisc.ac.in   📞 +91-9682656078   GitHub

🔗 faizanphysics.com   Inspire HEP

Education

PhD	**Theoretical High-Energy Physics**	Jan 2020 – Present

- Institute: Indian Institute of Science, Bangalore
- Advisor: Prof. Aninda Sinha
- Thesis: New approaches for the S-matrix and conformal bootstrap

MS-Thesis	**Theoretical High-Energy Physics**	Aug 2018 – Aug 2019

- Institute: International Centre for Theoretical Sciences (ICTS), Bangalore
- Advisor: Prof. Rajesh Gopakumar, Centre Director
- Thesis: Perturbative Mellin correlators in $\mathcal{N} = 4$ Supersymmetric Yang-Mills theory

BS-MS	**Major: Physics, Minor: Mathematics**	Aug 2014 – Aug 2019

- Institute: Indian Institute of Science Education and Research, Bhopal
- GPA: Major: 3.9/4.0 (9.73/10), Overall: 3.7/4.0 (9.27/10)

Publications

- **Bootstrapping string models with entanglement minimization and Machine Learning**   Sep 2024
  Faizan Bhat, Debapriyo Chowdhury, Arnab Priya Saha, Aninda Sinha
  To be published, arXiv: 2409.18259 [hep-th]

- **Perturbative Mellin amplitudes of $\mathcal{N} = 4$ SYM**   Dec 2023
  Faizan Bhat, Pronobesh Maity
  To be published, arXiv: 2312.17692 [hep-th]

- **Bootstrapping high-energy observables**   Nov 2023
  Faizan Bhat, Debapriyo Chowdhury, Aninda Sinha, Shaswat Tiwari, Ahmadullah Zahed
  Published: JHEP 03 (2024) 157, arXiv: 2311.03451 [hep-th]

- **A Celestial route to AdS bulk locality**   Apr 2023
  Faizan Bhat, Ahmadullah Zahed
  Published: JHEP 08 (2023) 112, arXiv: 2304.02003 [hep-th]

- **Twistor coverings and Feynman diagrams**   Dec 2021
  Faizan Bhat, Rajesh Gopakumar, Pronobesh Maity, Bharathkumar Radhakrishnan
  Published: JHEP 05 (2022) 150, arXiv: 2112.05115 [hep-th]

Teaching and Research Supervision

Teaching Assistant at IISc Bangalore	Aug 2022

- Course: Mathematical Methods for Physics

- Instructor: Prof. Aninda Sinha
- Resposibilities: Conducting regular tutorials. Helping set up and grading weekly assignments. Helping set up the mid-term/end-term test papers and grading the answer sheets.

UG Thesis Supervision 2023-24

- Co-supervising the BS and MS theses of two UG students at IISc with Prof. Aninda Sinha
- The goal is to develop methods to simulate Quantum Field Theories using Continuous-Variable Quantum Computing

Talks and Poster presentations

- ***Boostrapping String-like amplitudes using Entanglement Minimization and Machine Learning*** (video) Nov 2024
  Event: ICTS String Seminar
  Venue: International Centre for Theoretical Sciences (ICTS), Bangalore, India

- ***Studying the experimental ρ-parameter using the numerical S-matrix bootstrap*** Mar 2024
  Event: ICTP/SISSA Journal Club
  Venue: International Centre for Theoretical Physics (ICTP), Trieste, Italy

- ***Bootstrapping High-Energy Observables*** (video) Dec 2023
  Event: Indian Strings Meeting '23
  Venue: Indian Institute of Technology, Bombay, India

- ***Bootstrapping scattering amplitudes at high energies*** Oct 2023
  Event: ICTP Workshop on String Theory, Holography, and Black Holes
  Venue: International Centre for Theoretical Physics (ICTP), Trieste, Italy

- ***A celestial route to AdS Bulk locality*** Jul 2023
  Event: Advanced Summer School in Quantum Field Theory and Quantum Gravity
  Venue: ICISE, Quy Nhon, Vietnam

Awards and Fellowships

- Prime Minister's Research Fellowship given to exceptional UG students for pursuing doctoral research in India with full funding and generous travel grants. Jan 2020 - Present
- Strings 2025 Fellowship to attend the Strings 2025 Conference, NYU Abu Dhabi, UAE Jan 2025
- HECAP Short-term Visiting Fellowship of ICTP, Trieste, Italy Feb 2024 - Mar 2024
- Long Term Visiting Students Fellowship of ICTS, Bangalore, India Aug 2018 - Dec 2019
- ICTS-S.N.Bhatt Memorial Excellence Fellowship of ICTS, Bangalore, India May 2018 - Jul 2018
- Visiting Students Research Program Fellowship of the Tata Institute for Fundamental Research (TIFR), Mumbai, India May 2017 - July 2017
- Recipient of the *"Best Student Researcher"* award as a part of the VSRP fellowship of TIFR, Mumbai, India May 2017 - July 2017
- INSPIRE-Scholarship for Higher Education given to exceptional students for UG studies in India Aug 2014 - Aug 2019

Conferences and workshops

- Strings 2025, NYU Abu Dhabi, Abu Dhabi, UAE Jan 2025
- QCD meets Gravity '24, National Taiwan University (NTU), Taipei, Taiwan Dec 2024

- Cosmological Correlators, National Taiwan University (NTU), Taipei, Taiwan — Dec 2024
- Indian Strings Meeting, IIT Bombay, Mumbai, India — Dec 2023
- ICTP Workshop on String Theory, Holography, and Black Holes, ICTP, Trieste, Italy — Oct 2023
- Advanced Summer School in Quantum Field Theory and Quantum Gravity, Quy Nhon, Vietnam — July 2023

Technical Skills

- **Languages:** C++, Python, HTML
- **Packages:**
    - Mathematica
    - MATLAB
    - PyTorch: a Python package for Deep Learning via neural networks
    - Strawberry Fields: a Python package for simulating continuous-variable quantum computations
    - SDPB: a parallelized, arbitrary-precision semi-definite optimization package

Science Communication

- Dark Matters, Kernel - the IISc research newsletter
- Rapid Method to Detect SARS-CoV-2 Spike S1 Antigen, Research Highlights, IISc
- 3D shaping of microscopic membranes that underlie cellular processes, IISc Press Release

Languages

English, Hindi, Urdu, Kashmiri