

Syed Faraz Mohd Mehdi

Curriculum Vitae

Graduate Teaching Assistant,
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Summary

I am a physics graduate student at Wayne State University with reading project experience in quantum field theory, higher-order calculations in pQCD, and research experience in applying group theoretic techniques to open quantum systems. I am interested in pursuing research on THEP (Theoretical High Energy Physics).

Education

203–Present1 **GTA**, *Wayne State University*, Detroit, Michigan, USA

2019–2021 **M.Sc**, *University of Mumbai*, Mumbai, India, India
CGPA: 9.67/10.00, Rank: 2nd out of 82 students.

Relevant Courses

- Mathematical Physics (Grade Point 10/10)
- Quantum Mechanics I (Grade Point 9/10)
- Quantum Mechanics II (Grade Point 10/10)
- Group Theory (Grade Point 10/10)
- Particle Physics (Grade Point 9/10)
- Quantum Field Theory (Grade Point 8/10)

Publications

- Solanki, P., Mehdi, F. M., Hajdušek, M., & Vinjanampathy, S. (2022). Symmetries and Synchronization Blockade. *Physical Review A* 108 (2), 022216
- Mehdi, F., & Kolwankar, K. M. (2020), Low-cost experiment to measure the speed of light. *Physics Education*. 36(4), 12-17.

Academic Merits

- Cleared national exam GATE-2022 with 90.5 percentile, and JAM-2019.
- Cleared University of Mumbai Entrance Exam (2019), All India Rank-1.
- Batch topper for 10 consecutive years.

Research Experience

Master's Thesis Work.....

Fall 2020– **Group theoretic applications in open quantum systems**

Fall-2021 Supervisors: **Dr. Sai Vinjanampathy**, *Indian Institute of Technology Bombay, Mumbai, India*

- Introduction to open quantum systems and quantum information.
- Literature survey on classical and quantum synchronization.
- Studied the change in synchronization blockade condition by going from Euler to Tait-Bryan angles.

Projects.....

Fall 2021– **Introduction to perturbative quantum chromodynamics**

Present Supervisor: **Prof. Anuradha Misra**, *University of Mumbai, Mumbai, India*

- Origin and regularization of leading order divergences in QED and QCD and their regularization techniques.
- Gauge theories in Standard Model.
- Gauge fixing, ghost Lagrangian, and renormalization group in QFT.

Fall 2021– **Group theoretic applications in open quantum systems**

Present Supervisor: **Dr. Sai Vinjanampathy**, *Indian Institute of Technology Bombay, Mumbai, India*

- Proposed a new theorem governing the synchronization blockade regime, based on the system's symmetry.
- Derived the mathematical proof of the proposed theorem.
- Calculated the Haar measures for different Lie Groups.

December 2017– **Study of the angles of dendritic patterns formed on induced drying of liquids**

- May 2019 Supervisor: **Dr. Kiran Kolwankar**, *R.J. College, University of Mumbai, India*
- Collection of data using optical tweezer at Tata Institute of Fundamental Research, India.
 - Applied statistical techniques on different data sets of the angles of dendritic patterns.
 - Hypothesized a possible relation between the angle distribution and Ramachandran plot.

Fall 2018 **Low-cost experiment to measure the speed of light.**

Supervisor: **Dr. Kiran Kolwankar**, *R.J. College, University of Mumbai, India*

- Construction of an apparatus to measure the speed of light inside an undergraduate laboratory.
- Improved the SNR.
- Measured the speed of light with $< 5\%$ uncertainty.

April 2018- **Intensity distribution of a fractal-dimensional source**

Fall 2019 Supervisor: **Dr. Kiran Kolwankar**, *R.J. College, University of Mumbai, India*

- Construction of a fractal dimensional light source.
- Plotting and studying the intensity distribution.
- Simulated the experiment for an ideal fractal dimensional source on Scilab.

International Conferences & Workshops

- 16-22 Feb 2023 **International Meeting on High Energy Physics (IMHEP-2023)** at Institute of Physics (IOP), Bhubaneswar, India.
- 02-09 Nov 2022 Attended the school on **Recent Advances in perturbative Quantum Chromodynamics** (*Speakers: Prof. Eric Laenen, and Prof. Anuradha Misra*) at Centre for Excellence in Theoretical and Computational Sciences, University of Mumbai, India.
- 04-07 Mar 2020 **International Conference on Complex Quantum Systems (ICCQS-2020)** at Bhabha Atomic Research Centre (BARC), Mumbai, India.
- 28-31 Jan 2020 **Indo Japan Accelerator School cum Workshop (IJAS-2020)** at Variable Energy Cyclotron Centre, Kolkata, India.
- 03-14 June 2019 **Summer of Physics 2019** at Indian Institute of Technology Bombay, Mumbai, India.
- June 2018 **Summer School in Theoretical Physics** organized by **Indian Association of Physics Teachers**, at S.I.E.S. College, Mumbai, India.
- 19 Nov 2018 **Mumbai Area Complex Systems Conferences** at Pillai College of Engineering, Panvel, India.

Techniques and Skills

- Mathematica, \LaTeX , Python.
- 5 years tutoring experience, (*Grade: XI-XII, subjects taught: Classical Mechanics, Optics, Electrostatics, Electromagnetism, Current Electricity*).
- *Languages*: English: Full working proficiency, (Duolingo score:135)

Achievements

- **Gold Medal** in Inter-Collegiate Physics Event *Physikofun*, in the physics fest *FIZZICS-2019* at R. D. National College, Mumbai, India.
- **First Prize** in Intra-Collegiate Physics Event *Physitech 2018-19*, for the project *Exo-Planets: Study and how to find them* at R. J. College, Mumbai, India.
- **Bronze Medal** in Inter-Collegiate Physics Event *Philofizzics*, for the project *Exo-Planets: Study and how to find them* in the physics fest *FIZZICS-2019* at R.D. National College, Mumbai, India.
- Presented the project *Refinement of low-cost method for the estimation of speed of light* at *Avishkar-2018*, Mumbai, India.
- *Second rank* holder in the college seminar presentation *Physitech-2017-18* at R. J. College, Mumbai, India.
- Organized the Intra-Collegiate physics event *Physitech 2018-19*.
- Volunteered for the Intra-Collegiate physics event *Physitech 2016-17*.

References

1. **Dr. Sai Vinjanampathy**
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2. **Prof. Anuradha Misra**
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3. **Dr. Kiran Kolwankar**
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