

# Aashish Tripathee

## *Curriculum Vitae*

### CONTACT

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### EDUCATION

**University of Michigan**, Ann Arbor, MI

Ph.D., Physics, *Expected*: Summer 2022

- Advisor: Keith Riles

**Massachusetts Institute of Technology**, Cambridge, MA

B.S., Physics, June 2017

- Thesis: *Jet Substructure at the Large Hadron Collider*
- Thesis Advisor: Jesse Thaler

### RESEARCH PROJECTS

**Detection of Gravitational Waves**

With Prof. Keith Riles

May, 2018 - Present

*Department of Physics, University of Michigan*

- Designing numerical algorithms to analyze data from continuous gravitational waves emitted by rapidly spinning neutron stars.
- Performing signal processing and numerical analysis of algorithms to look for gravitational wave sources with a spindown.

**Microstate Counting**

With Prof. Leopoldo A. Pando-Zayas

September - December, 2017

*Leinweber Center for Theoretical Physics (LCTP)*

- Studied microstate counting of the Bekenstein-Hawking entropy of supersymmetric asymptotically  $AdS$  black holes.
- Performed numerical computation of the topologically twisted index of magnetically charged asymptotically  $AdS_4$  black holes.

**Numerical Evaluation of Wilson Loops**

With Prof. Leopoldo A. Pando-Zayas

July - December, 2017

*Leinweber Center for Theoretical Physics (LCTP)*

- Studied half-supersymmetric Wilson loops in  $\mathcal{N} = 4$  on the field theory side.
- Computed Wilson loops using Hamiltonian Monte Carlo methods.

### Jet Substructure Studies with CMS Open Data

With Prof. Jesse Thaler

January, 2015 - May, 2017

*Center for Theoretical Physics (CTP)*

- Performed the first ever physics study on the CMS Open Data to test the QCD  $1 \rightarrow 2$  splitting function.
- Extracted relevant physics information (particles, jets, trigger information, etc) from over 2 Terabytes of CMS Open Data consisting of  $36.1 \text{ pb}^{-1}$  of 7 TeV proton-proton collisions at the Large Hadron Collider.
- Designed an ASCII file format to hold particle collision data to store relevant data from the raw ROOT files.
- Performed basic substructure analysis and a study of the 2-prong substructure of jets in C++.
- Generated and computed comparable samples with Monte Carlo parton shower generators for overlay with results from data.

### Control System for an Ion Source for the IsoDAR Experiment

Prof. Janet Conrad's Group

March, 2016 - March, 2017

*Laboratory For Nuclear Science (LNS)*

- Built a control system for automatic controlling and monitoring of a multi-cusp ion source for the IsoDAR (Isotope Decay-at-Rest) experiment to study the existence of sterile neutrinos.
- Designed and implemented data transfer protocols to talk to electronics via Arduinos.
- Implemented low latency two-way communication from the control computer to individual electronic components via a central Raspberry Pi server and corresponding Arduinos.

### Numerical Analysis of the Ising Model using MCMC

With Dr. Homer Reid

September, 2016 - January, 2017

*Department of Mathematics, MIT*

- Built a MC solver in C++ for the Ising model based on the Metropolis-Hastings algorithm, with the eventual goal of generalizing it for numerical modelings for lattice gauge theory.
- Computed critical exponents and modeled phase transitions numerically.

### Control System for an Environment-Sensing UAV

Senseable City Lab and Interactive Robotics Group

December 2013 - June 2014

*Media Lab & CSAIL*

- Developed a JavaScript application to control and monitor an environment sensing UAV by live transmission of user actions.
- Implemented real-time data visualization using data-stream sent back by the UAV- chlorophyll and phycocyanin level, hyperspectral images, UAV position and altitude.

## CONFERENCES AND SEMINARS

- “Jet Substructure Analysis with CMS Open Data”, BOOST 2017, *Jul. 2017*

## AWARDS AND HONORS

- Philip Morse Memorial Award, *MIT Physics Department, 2017*

## TEACHING

Graduate Student Instructor

Fall 2018

Physics 401- Intermediate Mechanics  
*University of Michigan*

Graduate Student Instructor

Winter 2018

Physics 241- Elementary Laboratory II  
*University of Michigan*

Graduate Student Instructor

Fall 2017

Physics 141- Elementary Laboratory I  
*University of Michigan*

Grader

Fall 2014 - Fall 2016

8.022 Physics II, 8.03 Physics II, 8.044 Statistical Physics I  
*Massachusetts Institute of Technology*

## OUTREACH

[www.physicsden.org](http://www.physicsden.org)

Fall 2016 - Present

Built and working on a website that converts physics research papers into guided problems to communicate research and to provide starting researchers a place to start.

## PUBLICATIONS AND PREPRINTS

- [1] Andrew Larkoski, Simone Marzani, Jesse Thaler, Aashish Tripathee, and Wei Xue. Exposing the QCD Splitting Function with CMS Open Data. *Phys. Rev. Lett.*, 119(13):132003, 2017.
- [2] Aashish Tripathee, Wei Xue, Andrew Larkoski, Simone Marzani, and Jesse Thaler. Jet Substructure Studies with CMS Open Data. *Phys. Rev.*, D96(7):074003, 2017.