Mohit Srivastav

Bio Sketch

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MohitS704
Ph.D. Student at Johns Hopkins University

Education

2022 — **Ph.D. Candidate**, Johns Hopkins University (JHU)
Advisor: Dr. Andrei Gritsan

2018–22 — **B.S. Physics, B.A. Computer Science**, University of Virginia (UVA)
Highest Distinction in Physics, High Distinction in Computer Science with Thesis

2014–18 — **IB & Advanced Diploma**, South Lakes High School

Publications

CMS Collaboration. Measurement of the higgs boson mass and width using the four-lepton final state in proton-proton collisions at $\sqrt{s} = 13$ TeV, 2024.

Experience

Analysis Work

2023 — **Off-shell Higgs Boson**, *CMS Joint 4-Lepton Study Team (CJLST)*
- Produced constraints on the mass and width of the Higgs Boson, as well as anomalous Higgs Boson couplings, with the CMS detector at CERN [1]
- Working on the κ Framework extension included in the CMS Higgs Grand Combination
- Working on new off-shell analysis examining Higgs production modes in the off-shell region

2022 — **Spin-Parity Analysis of a Tetraquark Candidate**, *CMS B-Physics*
- Finding the spin and parity of 3 low-mass resonances which constitute a candidate for a tetraquark, a new type of matter
- BPH-24-002 in progress

2020–22 — **Optimizing Cuts for Experimental Dead-time**, *Mu2e Collaboration*
- Utilized machine learning to minimize experimental deadtime at high beam intensities
- Studied the aging of test-stand di-counters for particle detection
- Culminated in my Distinguished Majors Interdisciplinary Thesis in Computer Science

Technical Work

2023 — **Parton Showering and Filtering**, *CJLST*
- Worked in conjunction with experts to establish better parton showering for off-shell Higgs Boson simulation to better match data
- Produced a better filter for the 4-lepton channel to be used in off-shell Higgs Boson simulation

2022 — **JHUGen/JHUGen-MELA Development**, *Johns Hopkins University*
- Developer for the JHUGen Package, which includes a Monte Carlo generator as well as a reweighting scheme
- Created new Python bindings using PyBind11 to release a version of JHUGen-MELA in Python
- Writing documentation for the JHUGen-MELA package utilizing Doxygen
- Version 7.5.7 released Dec. 20, 2024

2022 — **CMS Tracker Alignment**, *Tracker Alignment Group*
Provide alignments for the CMS tracker and validate performance over time

Conference Talks & Posters

2024 **The Higgs Boson Width and Couplings from Off-shell Production**
USCMS Meeting – Princeton, NJ

2024 **JHUGen-MELA Tutorial for Higgs SM EFT**
LPC EFT Workshop – University of Notre Dame, IN

2024 **JHUGen-MELA Tutorial for Off-shell Higgs Study**
LPC Off-shell Higgs Boson Workshop – Fermi National Accelerator Laboratory, IL

2023 **Analysis of Hadronic Resonance Structures in the $J/\psi J/\psi$ Invariant Mass Spectrum**
American Physical Society April Meeting – Minneapolis, MN

2022 **Improvements to Cosmic Muon Identification Using Machine Learning**
Virginia Space Grant Consortium Research Symposium – Norfolk, VA

2021 **Improvements to Cosmic Muon Identification Using Machine Learning**
APS Meeting of the Division of Particles and Fields – Florida State University, FL

Awards and Honors

2024 **CMS IRIS-HEP Analysis Software Training (March. 2024)**

2023 **URA P5 Fermilab Travel Grant (Dec. 2023)**

2021 **Mitchell Undergraduate Research Scholarship (June. 2021)**

2021 **Virginia Space Grant Consortium Research Scholarship (Apr. 2021)**

2021 **SULI Argonne Lab (January 2021)**
Accepted, did not go due conflict with research plans

2020 **DAAD Rise Research Fellowship (March 2020)**
Accepted, cancelled due to COVID-19

2020 **SULI Jefferson Lab (January 2020)**
Accepted, cancelled due to COVID-19

Selected Teaching Experience

Head TA, *Classical Mechanics for Majors*, Fall 2024
Head TA for Physics 1 for Physics Majors

TA, *General Physics Lab*, Fall 2023 – Spring 2024
TA for General Physics Lab 1 & 2

TA, *Computer Algorithms*, Summer 2020 – Spring 2021
TA for CS 4102

TA/Head TA, *Introductory Computer Science in Python*, Spring 2019 – Spring 2022
TA and Head TA for CS 1110/1111

Other Experience

2023–24 **Fitness Monitor**, *Ralph O'Connor Rec Center*, JHU
Helped manage facilities, play music, and interact/help patrons at the gym

2019–21 **Treasurer**, *International Relations Organization*, UVA
Managed taxes and finances on the order of $30k for the 501c3 International Relations Organization at the University of Virginia