

Matthew Joyce | Postdoctoral Research Applicant

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Education

University of Virginia

Charlottesville, VA

PhD in Physics (expected completion in June 2021)

2015-present

Thesis: "Search for supersymmetry in diphoton final states with the CMS detector"

Advisor: Professor Brad Cox

Virginia Polytechnic Institute and State University

Blacksburg, VA

MS in Physics

2005-2008

Virginia Polytechnic Institute and State University

Blacksburg, VA

BS in Physics

2001-2005

Experimental Physics Experience

University of Virginia

Charlottesville, VA

PhD candidate in Physics

2015-present

Active member of Compact Muon Solenoid (CMS) Experiment at CERN.

- Detector research and development for the Minimum Ionizing Particle Timing Detector (MTD) for the CMS Experiment at the Large Hadron Collider (LHC)
- Design and fabrication of mechanical parts using CAD software and machine shop equipment.
- Performed radiation and thermal stress studies on optical glues for coupling scintillation crystals to photosensors.
- Development and operation of testing apparatus to extract time resolution and light collection efficiency for Barrel Timing Layer (BTL) detector components.
- Lead role in test beam efforts for BTL detector components carried out at Fermilab's Test Beam Facility.
- Major contributor to SUSY diphoton analysis
- Implemented multivariate analysis technique to suppress instrumental background for physics analysis
- Using data-driven methods to estimate backgrounds
- Managing, processing, and analyzing large amounts of data
- Managed and mentored undergraduate student workers in the lab

Virginia Polytechnic Institute and State University

Blacksburg, VA

Research Assistant in Physics

2005-2008

Active member of the Borexino Solar Neutrino Experiment Collaboration.

- Engineered sealed radioactive sources for calibration of the Borexino Solar Neutrino Detector
- Involved in design, fabrication, and installation of radioactive source insertion/calibration system
- Led team of scientists in electronics monitoring and data acquisition shifts
- Participated in Borexino calibration campaign.

Skills

- Experience in detector research and development using various methods and equipment including photospectrometry, radioactive sources, and accelerators
- Proficient in signal processing and data acquisition systems (particularly DRS digitizer)
- Mechanical engineering and design experience using SolidWorks
- Competency in machining, including work with mills and lathes.
- Programming experience with C++, Python, ROOT, HTCondor, CMSSW, Geant4, Madgraph, and Pythia
- Familiarity with UNIX systems and Fermi Grid

Conferences

"LYSO:Ce Crystals and SiPM Sensors for the CMS MTD Barrel Timing Layer"

Parallel talk at American Physical Society April Meeting

Apr. 2021

Virtual Meeting

"A Search for new physics in the diphoton final state using multivariate analysis"

Poster at American Physical Society April Meeting

Apr. 2021

Virtual Meeting

"Precision Timing with the CMS MTD Barrel Timing Layer for HL-LHC"

Parallel talk at Southeastern Section of the American Physical Society

Nov. 2020

Virtual Meeting

"Precision Timing with the CMS MIP Timing Detector"

Parallel talk at American Physical Society April Meeting

Apr. 2019

Denver, CO

Select Publications and Papers

"Precision timing with LYSO:Ce crystals and SiPM sensors in the CMS MTD barrel timing layer"

Presented at 15th Topical Seminar on Innovative Particle and Radiation Detectors

JINST 15 (2020) C04014

"A MIP Timing Detector for the CMS Phase-2 Upgrade"

Technical Design Report

CERN-LHCC-2019-003, CMS-TDR-020

"First real time detection of ${}^7\text{Be}$ solar neutrinos by Borexino"

Physics Letters B, Volume 658, Issue 4, 2008

Other Activities

UVA Physics Department

Charlottesville, VA

Graduate Student Representative on Diversity, Equity, and Inclusion (DEI) Committee

2020-present

Enhancing and sustaining a diverse culture in the Physics Department and contributing to making the Department an inclusive community where all are welcomed.

- Providing a graduate perspective to the work of the DEI Committee
- Working with faculty members to draft a Statement of Inclusion for the Physics Department
- Serving as point of contact for people in the graduate cohort to bring department-related issues of diversity, equity, and inclusion to the attention of the DEI Committee
- Communicating opportunities to the graduate cohort to participate in DEI Committee-organized events and programs
- Participating and helping to develop DEI programs

UVA Physics Department

Charlottesville, VA

High Energy Physics Representative in Graduate Physics Student Association (GPSA) 2017-2018

Representing the interests of Physics graduate students at the University of Virginia

- Founded and administered a bi-weekly social event for graduate student in Physics geared toward professional development
- Helping to develop monthly journal club meetings
- Coordinating with representatives from the Graduate School of Arts and Sciences Council

UVA Physics Department

Charlottesville, VA

Adjunct Faculty

2013-2015

Introductory Physics instructor at University of Virginia

Virginia Tech Physics Department

Blacksburg, VA

Adjunct Faculty

2008-2013

Introductory Physics instructor at Virginia Tech