Wei Shi

CONTACT INFORMATION

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https://gitlab.cern.ch/wshi

EDUCATION

Rice University, Houston, USA

Ph.D. Physics and Astronomy, June 2020 (estimate)
M.S. Physics and Astronomy, December 2017

- Proposal: *An Application of Multivariate Analysis to the EMTF p_T Look-Up-Table and Improvements to Dark Sector Searches*

Zhejiang University, Hangzhou, China

B.S. Physics, May 2015

- Thesis: *New Chalcogenide Materials Research*
- GPA: 3.49/4.00

EDUCATION EXPERIENCE

Rice University

Graduate Student 05/2016-Now

- Muon algorithm development
  - EMTF p_T regression and classification using boosted decision trees (BDT), k-nearest neighbor (k-NN) and deep neural network (DNN)
  - Development of EMTF Analyzer
- Prompt analysis
  - Rate, efficiency, pileup dependence study in EMTF
  - EMTF/CSCTF track p_T resolution and track building performance
  - Timing synchronization of local charged tracks in cathode strip chambers

Research Assistant 05/2016-Now

- Dark SUSY model implementation in FeynRules2.0 and MadGraph 5
- Pre-GEN Les Houches Event (LHE) files preparation using bash with MadGraph 4&5
- Scale factor study of muon identification & isolation using Tag & Probe method
- Development of mujet analysis analyzer
  - Migration from AOD to MiniAOD data format in CMSSW
- Study ggH/VBF/VH Higgs production modes in NMSSM MC (PYTHIA8)

Teaching Assistant 01/2016-06/2017

- PHYS 526 Statistical Mechanics
- PHYS 201 Modern Physics
- PHYS 126 Optics and Waves experiment

CERN, Geneva, Switzerland

Associate Member 06/2017-08/2018

- Developer of Level-1 (L1) trigger online control and monitor software

- Iterative Level-3 muon Outside-In reconstruction algorithm optimization
- CMS experiment operations
  - L1 trigger system on-call expert (L1 DOC)
  - Data acquisition shifter
  - Trigger shifter
  - Central shift leader
  - L1 subsystem EMTF on-call expert

Additional Experience

Superconducting Quantum Circuit Group, Zhejiang University
Internship 06/2013-06/2014

- Study quantum nondemolition(QND) measurement in superconducting quantum circuits
  - Design, assemble, test and calibrate the microwave circuit system used in QND measurement, including DAC/ADC boards, clocks, low pass filters, differential amplifiers, I-Q mixers and power dividers
  - Initialize and calibrate FPGA on the DAC board with Quartus II Programmer; test and calibrate the specified output waveform, frequency spectrum and output phases via Python

Quantum Transport Lab, Rice University
Internship 07-09/2012, 2014

- Study 2D electron gas
  - Study the fabrication of 2D Niobium alloy films using magnetron sputtering and photolithography technology
  - Critical temperature measurement of films in cryogenic transport system with magnetic field
  - Realization of instantaneous instrument control over Keithley model 6221 for DC current source, data acquisition from nanovoltmeter model 2182A for direct voltage and Anritsu MG3684B for microwave power attenuation using LabVIEW
  - Calibration test on low-temperature thermometer CX-1050-AA with lock-in amplifier SR830 DSP and numeric curve fitting for temperature and resistance relationship using MATLAB

UC Davis Crocker Radiation Laboratory, Davis, USA
Research Assistant 05/2017

- Total irradiation dose (TID) and Single Event Upset (SEU) test for muon port card components, including Spartan-6 FPGA, XCF32P EPROMs, Cypress S25FL128S SPI Flash Memory, Reflex Photonics SNAP12 receiver

Texas A&M University, College Station, USA
Visiting scholar 10/2016-09/2018

Citizens School Program, Houston
Organizer & Teacher 01/2017-05/2017

- Involved in designing a one-semester-long "Fun with physics" program for middle school students; teach fundamental science law via hands-on experiments using scientific method

- Gave a 75-minute lecture on the waves topic for a class of 25 students; designed and carried hands-on experiments such as string phone, bending light using total reflection, and Doppler rocket

Rice Chinese Students and Scholars Association, Houston
Treasurer 05/2016-05/2017

- Funding & Grant applications for the association
- Reimbursement and Audition of expenses

Selected Publications

CMS Collaboration, "Boosted Decision Trees in the Level-1 Muon Endcap Trigger at CMS", CMS Conference Report 2017/357 (2017).

Search for beyond the Standard Model new light boson decaying into muon pairs at CMS. *HIG-18-003*

Programming Languages

Proficient: ROOT, C/C++
Familiar: Python, Bash, MATLAB, Java, Polymer, CSS, LabVIEW, LaTeX
Hardware: Keil μVision IDE, Altera Quartus II, Xilinx iMPACT