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Academic Positions and Education

- *Research scientist, 2017-present*, University of Science and Technology of China.

- *Postdoctoral researcher, 2014-2016*, University of Manchester.

- *Postdoctoral researcher, 2009-2014*, University of Pennsylvania.

- *Ph.D. Physics, 2008*, University of Texas at Austin.

- *M.A. Physics, 2002*, Johns Hopkins University.

- *B.S. Physics, 1998*, Tomsk State University.

ATLAS Research

- My research interests focus on understanding physics of the electroweak symmetry breaking and searching for new phenomena through precise measurements of Standard Model properties, development and operations of experimental trigger systems and development of state of the art methods for lepton identification.

- Leading analysis effort for measurement of vector boson scattering with same sign W boson pairs using Run 2 ATLAS data. Reported preliminary ATLAS results for the observation of this process at ICHEP 2018 [1].

- Led USTC analysis effort for ATLAS search of heavy neutrinos [2]. Advised the analysis team on optimisation and evaluation of experimental sources of systematic uncertainty.

- Developed a novel method to veto electrons and muons produced in B hadron decays using lifetime information; supervised a Ph.D. student for development and calibration of this method. Our work has allowed to reject around 50 percent of the non-prompt leptons (that otherwise survive strict lepton identification and isolation requirements) while keeping more than 90 percent of prompt signal leptons. Our method was among the crucial analysis improvements that have led to the first ATLAS evidence for the associated production of the Higgs boson and a top quark pair in multi-lepton final states [3].

- Initiated and led the first ATLAS search for Higgs boson production in association with a top quark pair in multi-lepton final states [4]. Coordinated the analysis of Run 1 data, developed a commonly used analysis framework, designed a method to measure non-prompt lepton background, edited the publication of these results and advised three Ph.D. students.

- Initiated and led the first ATLAS search for $H \to \mu\mu$ decay [5]. Coordinated the analysis of Run 1 data, developed a background fitting model, computed statistical results, prepared the publication of the first LHC result in this channel and advised two Ph.D. students.

- Led the initial effort to include same lepton flavor channels into the $H \to WW \to l\nu l\nu$ analysis [6] that resulted in approximately 10% improvement in the $H \to WW$ branching ratio measurement.

Other ATLAS contributions

- Initiated and leading a new effort by USTC to measure performance of the ATLAS RPC detector and trigger. Developed new analysis tools; leading a group of eight PhD students and postdocs for application of these tools to analysis ATLAS collision data for detailed measurements of RPC detector efficiency and timing.

- Measured efficiency of single muon triggers with 2015 data using $Z \to \mu\mu$ events [7]. Developed an analysis framework which is used by the muon trigger group for measuring trigger efficiency with 2016 data.

- Led the development of tools for measuring resource utilisation by high level triggers (cost monitoring) [8] and for predicting trigger rates [9]. Developed initial triggers for recording enhanced bias data and procedures for predicting trigger rates at a higher instantaneous luminosity. These tools are used by the ATLAS collaboration for the long-term and short-term planning of data acquisition strategy. They proved critical for efficient trigger operations [10] during the first three years of LHC data taking when they helped to maximise trigger rates of interesting physics processes.

- Developed a software framework for caching and reusing computationally intensive high level trigger results. This tool improved processing speed of the ATLAS high level trigger by approximately 30%.

- An on-call expert for the trigger menus and core trigger software during 2010-2011 data taking.

- Proposed and implemented an analysis computing model that uses group-funded resources co-hosted at the Manchester T2 cluster. This model has significantly improved efficiency of resource intensive analysis tasks.

Awards and Contributions

- International Fellowship for young scientists from the President of Chinese Academy of Sciences.

- A shift leader in the ATLAS control room during 2015 and 2017 data taking.

- Coordinator and editor of the Run 1 $t\bar{t}H \to leptons$ analysis [4].

- Coordinator and editor of the Run 1 $H \to \mu\mu$ analysis [5].

- Co-editor of the first $H \to WW \to l\nu l\nu$ publication on 7 TeV data [11].

- A guide for underground tours of the ATLAS detector in 2014-2015.

- A member of the physics program committee for the US ATLAS 2013 Physics Workshop.

- A co-organiser of the 2012 ATLAS $t\bar{t}H$ workshop.

MINOS Research

- Ph.D. thesis measured ν_μ disappearance [12]. This work was cited by almost 40 papers and Ph.D. theses.

- Invented a novel multivariate (k-nearest neighbours or knn) muon identification algorithm which is being used by the MINOS collaboration for neutrino oscillation measurements [13]. Contributed the knn code to the Toolkit for Multivariate Data Analysis with ROOT (TMVA) project. The NOvA collaboration has recently adopted this method for the measurement of ν_μ disappearance.

- Designed a new method to measure hadronic shower energy in the MINOS detectors based on the knn regression algorithm. Advised a Ph.D. student for initial development and optimisation. This method improved precision of neutrino oscillation measurements (equivalent to approximately 10% more data).

- Developed a simple and efficient muon charge sign determination algorithm using typical muon trajectory in the MINOS toroidal magnetic field [14].

- Calibrated magnetic field of the MINOS near detector using muons produced in ν_μ interactions [15]. These calibration results were critical for MINOS measurements of ν_μ and $\bar{\nu}_\mu$ cross-section [14], and $\bar{\nu}_\mu$ oscillation [16].

- Analysed cosmic ray muon data to align the MINOS near detector [15]. Advised a Ph.D. student for measurements of alignment corrections using muons produced in ν_μ interactions.

- A commissioning shift leader during the MINOS near detector construction.

- Demonstrated that the MINOS photomultiplier tubes are not sensitive to helium poisoning.

References

- Prof. Joseph Kroll, University of Pennsylvania.

- Prof. Karol Lang (Ph.D. supervisor), University of Texas.

- Prof. David Strom, University of Oregon.

- Prof. Terry Wyatt, University of Manchester.

- Prof. Zhengguo Zhao, University of Science and Technology of China.

Conference Presentations

- *Recent Standard Model electroweak results from LHC*, China LHC Physics Workshop, Wuhan, China, 2018.

- *Tests of the electroweak sector sector with Diboson final states at the ATLAS Experiment*, Interntional Conference of High Energy Physics, Seoul, South Korea, 2018.

- *Searching for Higgs boson production in association with a top quark pair with the ATLAS detector*, China LHC Physics Workshop, Nanjing, China, 2017.

- *Searches for Higgs boson decay to dimuon pair and tau-muon pair, and top quark decay to Higgs boson and quark with ATLAS and CMS*, Higgs Couplings, SLAC, USA, 2016.

- *ATLAS review of the Higgs boson properties*, QUARKS-2016, Saint Petersburg, Russia, 2016.

- *Search for the Higgs boson in the ttH production mode using the ATLAS detector*, Large Hadron Collider Physics Conference, New York, USA, 2014.

- *Search for the Higgs boson with ATLAS*, BNL SUSY workshop, Upton, USA, 2012.

- *Search for Higgs boson decays into gauge bosons with ATLAS*, Standard Model at LHC Conference, Copenhagen, Denmark, 2012.

- *Resource utilisation by the ATLAS High Level Trigger*, Technology and Instrumentation in Particle Physics Conference, Chicago, USA, 2011.

- *Results from MiniBoone and MINOS*, American Physical Society April Meeting, St. Louis, USA, 2008.

Posters and Contributed Talks

- *Framework for data intercommunication and control of ATLAS High Level Trigger algorithms*, poster at IEEE-NPSS Real-Time Conference, Padova, Italy, 2016.

- *Status of the MINOS Near Detector*, contributed talk at American Physical Society April Meeting, Tampa, USA, 2005.

Seminars

- *Hunting for rare Higgs boson processes.* Manchester, UK, 2015.

- *Is the Higgs boson natural? What experiments can tell us.* CPPM Marseille, France, 2014.

- *Is the Higgs boson natural? What experiments can tell us.* LAPP Annecy, France, 2014.

- *Is the Higgs boson natural? What experiments can tell us.* LPC Clermont-Ferrand, France, 2014.

- *Recent Higgs results from ATLAS*, Rutgers, New Brunswick, NJ, 2013.

- *Recent Higgs results from ATLAS*, Yale University, New Haven, CT, 2013.

- *Recent Higgs results from ATLAS*, Caltech, Pasadena, CA, 2013.

- *Recent Higgs results from ATLAS*, Fermilab, Batavia, IL, 2012.

- *Recent Higgs results from ATLAS*, University of Texas, Austin, TX, 2012.

- *Searches for the Standard Model Higgs boson decays to WW with ATLAS*, Stony Brook University, Stony Brook, NY, 2011.

- *Searches for the Standard Model Higgs boson decays to WW with ATLAS*, William & Mary, Williamsburg, VA, 2011.

- *A measurement of the muon neutrino disappearance rate with the MINOS detectors and the NuMI neutrino beam*, University of Pennsylvania, Philadelphia, PA, 2008.

- *A measurement of the muon neutrino disappearance rate with the MINOS detectors and the NuMI neutrino beam*, SLAC, Menlo Park, CA, 2008.

- *A measurement of the muon neutrino disappearance rate with the MINOS detectors and the NuMI neutrino beam*, Penn State University, University Park, PA, 2008.

Supervision of Students

- Doug Schaefer, University of Pennsylvania: measurements of resource utilisation by high level triggers.

- Chris Lester, University of Pennsylvania: analysis of associated production of the Higgs boson and a top quark pair in multi-lepton final states with Run 1 data.

- Rhys Roberts, University of Manchester: development, implementation and calibration of a novel method to veto electrons and muons produced in B hadron decays using lifetime information.

- Wenxiao Wang, USTC: analysis optimisation and evaluation of experimental sources of systematic uncertainty for ATLAS search for heavy neutrino production at the LHC.

- Heng Li, USTC: performance measurements of the ATLAS RPC detector.

- Fudong He, USTC: improvements of the algorithm to veto electrons and muons produced in B hadron decays.

Teaching

- University of Manchester: Supervision of Master of Physics research project, 2015

- University of Texas at Austin: Assistant Instructor, Physics, 2002-2004.

- Johns Hopkins University: Teaching Assistant, Physics, 1998-2002.

Publications

- An author of more than a few hundred refereed papers as a member of the ATLAS and MINOS collaborations. Selected publications with significant personal contributions are included below.

[1] ATLAS Collaboration. *Observation of electroweak production of a same-sign W boson pair in association with two jets in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector.* ATLAS-CONF-2018-030, 2018.

[2] ATLAS Collaboration. *Search for heavy Majorana or Dirac neutrinos and right-handed W gauge bosons in final states with two charged leptons and two jets at $\sqrt{s} = 13$ TeV with the ATLAS detector.* JHEP, 01:016, 2019.

[3] ATLAS Collaboration. *Evidence for the associated production of the Higgs boson and a top quark pair with the ATLAS detector.* Phys. Rev., D97(7):072003, 2018.

[4] ATLAS Collaboration. *Search for the associated production of the Higgs boson with a top quark pair in multilepton final states with the ATLAS detector.* Phys. Lett., B749, 2015.

[5] ATLAS Collaboration. *Search for the Standard Model Higgs boson decay to $\mu^+\mu^-$ with the ATLAS detector.* Phys. Lett., B738, 2014.

[6] ATLAS Collaboration. *Observation and measurement of Higgs boson decays to WW* with the ATLAS detector.* Phys. Rev., D92(1), 2015.

[7] ATLAS Collaboration. *Performance of the ATLAS Trigger System in 2015.* Eur. Phys. J., C77(5):317, 2017.

[8] ATLAS TDAQ Collaboration. *The ATLAS Data Acquisition and High Level Trigger system.* Journal of Instrumentation, 11(06), 2016.

[9] Rustem Ospanov for the ATLAS Collaboration. *Resource Utilization by the ATLAS High Level Trigger during 2010 and 2011 LHC running.* Physics Procedia, 37(0), 2012.

[10] ATLAS Collaboration. *Performance of the ATLAS Trigger System in 2010.* Eur. Phys. J., C72, 2012.

[11] ATLAS Collaboration. *Search for the Standard Model Higgs boson in the $H \to WW^{(*)} \to l\nu l\nu$ decay mode with 4.7 fb^{-1} of ATLAS data at $\sqrt{s} = 7$ TeV.* Phys. Lett., B716, 2012.

[12] Rustem Ospanov. *A measurement of muon neutrino disappearance with the MINOS detectors and NuMI beam.* PhD thesis, Texas U., 2008.

[13] MINOS Collaboration. *Measurement of Neutrino Oscillations with the MINOS Detectors in the NuMI Beam.* Phys. Rev. Lett., 101, 2008.

[14] MINOS Collaboration. *Neutrino and Antineutrino Inclusive Charged-current Cross Section Measurements with the MINOS Near Detector.* Phys. Rev., D81, 2010.

[15] MINOS Collaboration. *The magnetized steel and scintillator calorimeters of the MINOS experiment.* Nucl. Instrum. Meth., A596, 2008.

[16] MINOS Collaboration. *First direct observation of muon antineutrino disappearance.* Phys. Rev. Lett., 107, 2011.