

王睿

基本信息

性别: 女	国籍: 中国
出生日期: 1986 年 4 月 29 日	民族: 汉族
婚姻状况: 未婚	籍贯: 武汉

教育经历

博士, 物理 新墨西哥大学, 美国, 新墨西哥州, 阿尔伯克基市 论文: “Discovery of the $B_c(2S)$ Meson and Development of Pixel Detectors for Future Particle Collider Experiments”	2014
硕士, 物理 新墨西哥大学, 美国, 新墨西哥州, 阿尔伯克基市	2011
本科, 应用物理 武汉大学, 中国, 湖北省, 武汉市 论文: “氢离子掺杂 ZnO 薄膜的电学光学性质”	2007

工作经历

博士后, 阿贡国家实验室	2014 至今
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Rui Wang

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EDUCATION

- Ph.D., Physics** 2014
University of New Mexico, Albuquerque, NM
Dissertation title: “Discovery of the $B_c(2S)$ Meson and Development of Pixel Detectors for Future Particle Collider Experiments”
- M.S., Physics** 2011
University of New Mexico, Albuquerque, NM
- B.S., Applied Physics** 2007
Wuhan University, Wuhan, Hubei, P.R. China
Thesis title: “The optical and electrical properties of ZnO nanofilm with H^+ implantation”

WORKING EXPERIENCES

Research Associate at Argonne National Laboratory 2014 - present

PHYSICS RESEARCH:

- **Resonance searches in di-jet final states at HL/HE-LHC** October 2017 - Present
Performance study of the resonance searches in di-jet final states at HL/HE-LHC.
High statistics MC sample has been generated using super computer to emulate the data at HL/HE-LHC. Working on expect limit interpretations and fit studies with various selections, including both di-jet final states and lepton associated productions. Wrote the sections related to b-tagging selection in the paper.
The study has been published in JINST and included in ATLAS HL/HE-LHC yellow report.
- **b-jet tagging performance and Machine learning** August 2015 - Present
As the b-tagging contact person of the ATLAS Exotics group, providing procedures and guidances to the analysis groups and feeding back analysis needs to the flavor tagging performance group.
Started applying machine learning to b-jets identification based on raw track hits and calorimeter cell energy. Designing and training machine learning algorithms using events

produced for an ATLAS-like detector with HepSim (<http://atlaswww.hep.anl.gov/hepsim/>). Large number of events are being generated on High Performance Computing machines for different flavour jets. The aim is to avoid tracking and vertex reconstruction which require lots of CPU resource, and to improve the b-tagging performance by providing complete detector information.

- **Resonance searches in di-jet final state with b-tagging** *December 2014 - Present*
Searching for heavy resonances in di-jet final state with b-tagging using the Run2 data at ATLAS.

Worked on selection optimization, systematics, fit and limit settings for the initial search using 2015 data. Studied the high p_T b-tagging performance. Then appointed as the contact person for this analysis using 2016 data. Working on both framework development, data preparation and MC studies, in addition to the selection optimization, systematics, fit and limit settings. One of the major editors of the supporting notes. Contributed to the conference note preparation.

The 2015 search result for TeV resonances has been published in PLB. Updated result with 2016 summer data was reported at ICHEP 2016. The 2015 search result for hundred GeV resonances has been reported at LHCP 2016. The 2015 plus 2016 data search result for both hundred GeV resonances and TeV resonances has been submitted to PRD.

The 2015 plus 2016 result is reinterpreted for the DM mediator and is under approval.

- **Resonance searches in dijet+X** *September 2016 - Present*

Searching for exclusively produced heavy resonance in the di-jet mass spectra using the Run2 data at ATLAS. The first signature being studied is di-jet plus lepton. By triggering on the lepton, the di-jet mass reach can be pushed down to Higgs mass region. Also the sensitivity to the EW processes will be highly enhanced.

Initiated the study. Working on both analysis framework development and data preparation. Contributing to selection optimization, systematics study, fit study and limit settings framework.

The 2015-2017 search result has been reported at LHCP 2018.

DETECTOR R&D, UPGRADE AND OPERATION:

- **Fast TracKer (FTK) project** *December 2014 - Present*

FTK is an upgrade project for the ATLAS TDAQ system. It uses custom hardware to provide full event tracking information at 100 kHz to the high level trigger (HLT).

Working on the FTK to Level-2 Interface card (FLIC), which is an ATCA based hardware interface to the current ATLAS TDAQ system. Work includes hardware testing, firmware debugging, and software development for the FLIC and ATCA processing blade; as well as the communication with the Readout System (ROS). Also developing the Detector Control System (DCS) software for the FTK project.

Studied the vertex reconstruction using the tracks provided by the FTK system and developed the fast online vertexing algorithm.

- **ITk project**

December 2014 - Present

The Inner Tracker (ITk) is the new full silicon tracker to be deployed after ATLAS Phase II upgrade.

Work extending into several areas of this project. Set up the test stands for ITk Pixel module testing and for the HVCMOS sensor testing and characterization in the lab. Characterizing the sensor and readout chip for the Pixel modules, and testing the HVCMOS sensors. Participated in test beams for ITk Pixel modules and various CMOS testing structures.

Actively working on the ITk upgrade simulation. One of the main developer of the tracking validation software for the ITk performance study. The expected Performance of the ITk has been published as conference note.

- **Detector operation**

June 2011 - Present

Took the detector system monitoring, data acquisition and run control shifts for ATLAS experiment. Communicating with other shifters and experts to ensure high data taking efficiency and resolve the warnings and errors, as well as making detailed documentations.

OTHER EXPERIENCES:

- **Instructing graduate students**

December 2014 - present

Instructing students at Argonne Analysis Support Center (ASC) on physics analysis framework development.

Instructing students on FTK DCS and online software development, FLIC hardware testing and commissioning.

Instructed ASC students on test stand setup in the lab and at test beam for silicon modules.

Research Assistant at University of New Mexico

2008 - 2014

PHYSICS RESEARCH:

- **The B_c meson and excited B_c meson states**

April 2012 - July 2014

Observed the B_c meson and the $2S$ states using the Run1 data at ATLAS. One of the two analyzers. Worked on MC signal generation, analysis framework development, data preparation, fit and significant calculation. Participated in the supporting note writing.

The analysis result has been published in PRL.

DETECTOR R&D, UPGRADE AND OPERATION:

- **Current monitoring through the HVPP4 for the ATLAS pixel detector** *September 2010 - July 2014*

Helped on HVPP4 system hardware production and installation. Performed radiation damage study of the pixel detector using HVPP4-based ATLAS Pixel Current Monitoring System. Compared the data to the Hamburg model to predict the detector lifetime

and long-term effects.

- **Diamond sensor characterization** *February 2010 - July 2014*
Set up the test stand for the diamond sensor characterization. Performed electrical characterization of diamond sensor under ATLAS pixel detector environmental conditions for the HL-LHC. Measured the leakage current of the diamond sensor samples with different irradiation fluence. The test has been repeated under different temperatures.
- **Planar silicon sensor test beam** *June 2011 - December 2012*
Planar silicon sensor tests were made using 4 GeV positrons at DESY and 24 GeV protons at CERN, both using the Eudet Telescope. Various irradiated and unirradiated planar silicon sensors and modules have been measured with different voltage and temperature settings.
- **Diamond sensor test beam** *June 2011 - December 2011*
Diamond sensor tests were made using the 24 GeV proton test beam at CERN. Both unirradiated and irradiated diamond sensors were placed on the beam line with silicon sensors for a cross check, and the scintillator or Eudet Telescope was used for the truth match.
- **ATLAS Insertable B-Layer (IBL) stave testing** *May 2012 - July 2012*
Carried out electrical tests of the Insertable B-Layer staves and system for the ATLAS Inner Detector upgrade.
- **Irradiation at LANSCE** *September 2009 - May 2014*
Using the 800 MeV proton beam at LANSCE, Los Alamos, various samples designed for high energy detectors (e.g. planar, 3D and diamond sensors, cables, electronics chips, integrated modules, and structural materials) have been irradiated to different fluences.

OTHER EXPERIENCES:

- **Supervising junior graduate students** *August 2013 - December 2014*
Trained two New Mexico M.S. students in ATLAS Offline, C++, GRID usage, and other computation skills.

COMPUTING EXPERIENCES

- **Languages**
Extensive knowledge of C++, Python and bash scripting, some experience with XML
- **Scientific Software**
ROOT, toolkits for Multivariate Data Analysis, Keras, TensorFlow, scikit-learn
- **Statistical method**
Monte Carlo Simulation, likelihood fit and limit setting

RECENT PRESENTATIONS

Precision Searches in dijets at the HL/HE-LHC, HL/HE LHC meeting, Fermilab, US, April, 2018

Searches for dark matter beyond mono-jets at ATLAS experiment, TeVPA 2017, Columbus, US, Aug. 2017

Heavy resonance search using b-tagged di-jet in Run, US LUA 2016 meeting, Berkeley, US, Nov. 2016

Exotics and SUSY Feedback, ATLAS Flavour Tagging Workshop 2016, Bonn, Apr. 2016

FTK status report ATLAS upgrade week, CERN, Apr. 2016

The FTK to Level-2 Interface Card (FLIC) at ATLAS, IEEE NSS MIC 2015, San Diego, US, Oct. 2015

Bc mass spectroscopy, Charm 2015, Detroit, US, May 2015

Recent results at ATLAS on the field of meson physics, Meson 2014 workshop, Kraków, Poland, May. 2014.

Production and spectroscopy of hadrons containing a b quark at ATLAS, DPF2013 Conference, UCSC, Aug. 2013.

Update on Resistivity Measurements of Irradiated Polycrystalline Diamond at UNM, RD42 Workshop, CERN, May 2013.

ATLAS Pixel Detector radiation damage monitoring with the High Voltage delivery system, RD50 Workshop, CERN, Nov. 2012.

SELECTED PUBLICATIONS AND PROCEEDINGS

Search for dijet resonances in events with an isolated lepton using $\sqrt{s} = 13$ TeV proton-proton collision data collected by the ATLAS detector, , **Rui Wang [ATLAS Collaboration]**, ATLAS-CONF-2018-015, Jun. 2018

Search for resonances in the mass distribution of jet pairs with one or two jets identified as b-jets in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, **Rui Wang [ATLAS Collaboration]**, (2018) arXiv:1805.09299 [hep-ex], submitted to Phys. Rev. D.

Precision searches in dijets at the HL-LHC and HE-LHC, S. V. Chekanov, J. T. Childers, J. Proudfoot, D. Frizzell and **R. Wang**, arXiv:1710.09484 [hep-ex], JINST **13**, no. 05, P05022 (2018)

The FTK to Level-2 Interface Card (FLIC) at ATLAS, J. Anderson, B. Auerbach, R. Blair, G. Drake, A. Kreps, J. Love, J. Proudfoot, M. Oberling, **R. Wang**, J. Zhang, IEEE NSS MIC 2015 conference record, Nov. 2016

Expected Performance of the ATLAS Inner Tracker at the High-Luminosity LHC, **Rui Wang [ATLAS Collaboration]**, ATL-PHYS-PUB-2016-025, Oct. 2016

Search for resonances in the mass distribution of jet pairs with one or two jets identified as b-jets with the ATLAS detector with 2015 and 2016 data, **Rui Wang [ATLAS Collaboration]**, ATLAS-CONF-2016-060, Aug. 2016

Search for resonances below 1.2 TeV from the mass distribution of b-jet pairs in proton-proton collisions at $\sqrt{s}=13$ TeV with the ATLAS detector, **Rui Wang [ATLAS Collaboration]**, ATLAS-CONF-2016-031, Jun. 2016

Search for resonances in the mass distribution of jet pairs with one or two jets identified as b-jets in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, **Rui Wang [ATLAS Collaboration]**, (2015) arXiv:1603.08791 [hep-ex], Phys. Lett. B **759**, 229 (2016).

The effect of humidity on reverse breakdown in 3D silicon sensors, H. McDuff, M. R. Hoferkamp, S. Seidel, **R. Wang**, C. J. Kenney, J. Hasi and S. I. Parker, Nucl. Instrum. Meth. A **785**, 1 (2015).

Observation of an Excited B_c^\pm Meson State with the ATLAS Detector, **Rui Wang [ATLAS Collaboration]**, [arXiv:1407.1032 [hep-ex]], Phys. Rev. Lett. **113**, no. 21, 212004 (2014)

A Leakage Current-based Measurement of the Radiation Damage in the ATLAS Pixel Detector, **Rui Wang [ATLAS Collaboration]**, (2014) ATL-INDET-PUB-2014-004.

Effect of Temperature and Charged Particle Fluence on the Resistivity of Polycrystalline CVD Diamond Sensors, **Rui Wang**, Martin Hoferkamp, Sally Seidel, Nucl. Instr. and Meth. A, doi: 10.1016/j.nima.2013.10.007 (2013) [arXiv:1310.2620 [physics.ins-det]].

Observation of the B_c^\pm meson in the decay $B_c^\pm \rightarrow J\psi(\mu^+\mu^-)\pi^\pm$ with the ATLAS detector at the LHC, **Rui Wang [ATLAS Collaboration]**, ATLAS-CONF-2012-02 (2012).

AWARDS AND HONORS

DPF 2013 travel reward.