

Lailin Xu

CERN
CH-1211, Geneva 23
Switzerland
☎ +41 22 76 76312
✉ lailin.xu@cern.ch

Professional Experience

- 2021-Present **Assistant Professor**, University of Sci. and Tech. of China (USTC), Hefei, China,
2015-2020 **Postdoctoral Research Associate**, Brookhaven National Lab, Upton, NY, USA, stationed at CERN working on the ATLAS experiment
2011-2013 **Visiting Research Investigator**, University of Michigan, Ann Arbor, MI, USA
2010-2015 **Research Assistant**, USTC, Hefei, China

Education

- 2010-2015 **Ph.D. in Physics**, USTC, Hefei, China.
Thesis: Study of Electroweak and Higgs Physics with ZZ Production in ATLAS.
Advisor: Bing Zhou (University of Michigan); Zhengguo Zhao (USTC).
2006-2010 **B.Sc in Physics**, USTC, Hefei, China.
Thesis: R&D of Long-strip Multi-gap Resistive Plate Chambers as a Time-Of-Flight detector.

Honors and Awards

- 2013 ATLAS PhD Grant, CERN, one of the first three recipients of the ATLAS PhD Grant, founded by ATLAS ex-spokespersons Peter Jenni and Fabiola Ginanotti.
2011-2013 PhD Fellowship for co-education, China Scholarship Council, selected by the Ministry of Education of the People's Republic of China.
2012 Young Scholar of Distinction, Ministry of Education of the People's Republic of China.
2010 Guo Moruo Award, USTC, highest honor of USTC undergraduate students.

Selected Research Experience

Leadership Activities

- 2019-Present **Convener of Weak Boson Processes Subgroup, ATLAS Physics Modeling Group**: Coordinating all aspects of Monte Carlo modelling of Single-boson and Multiboson processes in the whole ATLAS collaboration.
2019-Present **Convener of Off-shell and Interference Subgroup, LHC Higgs Cross Section Working Group**: Stimulate and facilitate experimental and theoretical efforts on off-shell Higgs and signal-background interference studies at the LHC.
2018-2019 **Coordinator of ATLAS Physics Modeling Group–Multiboson Focus Group**: Coordinating all aspects of Monte Carlo modelling of Multiboson processes in the whole ATLAS collaboration.
2016-Present **Co-leader of several key physics analyses in ATLAS**, using multiple gauge bosons to search for new phenomena and measure the Higgs boson properties:
• Combined searches for Dark Matter in 2HDM+Pseudoscalar, 2020-present.

- Higgs boson properties and couplings measurements in $H \rightarrow ZZ^* \rightarrow 4\ell$ channel, 2016-present.
- Higgs boson off-shell coupling measurements and constraints on the Higgs total width in $H \rightarrow ZZ$ channel at $\sqrt{s} = 13$ TeV, 2016-2018, published in PLB 786 (2018) 223.
- Search for heavy ZZ resonances in the 4ℓ and $\ell\ell\nu\nu$ final states using full Run 2 data, 2018-present, submitted to EPJC.
- Search for heavy $WW/WZ/ZZ$ resonances in the semileptonic final states using full Run 2 data, 2018-2020, accepted by EPJC.
- Searches for heavy ZZ and ZW resonances in the $\ell\ell qq$ and $\nu\nu qq$ final states at $\sqrt{s} = 13$ TeV, 2016-2017, published in JHEP 03 (2018) 009.
- Study of vector boson scattering in $WWjj/WZjj/ZZjj$ with semileptonic decay final states at $\sqrt{s} = 13$ TeV, 2017-2019, published in PRD 100, 032007 (2019).

Hardware work

- 2009-Present Extensive experience on R&D of novel silicon detectors and gaseous detectors, including development of data acquisition system and characterization of detectors using testbeam:
- Testbeam for silicon sensors and beam telescope data acquisition system development, 2015-2019.
 - Maintained the ATLAS MDT gas system and the gas monitor, 2013-2015.
 - Built and measured Long-strip Multiple-RPC detectors for BESIII ETOF upgrade and CBM time of flight detector, 2009-2011.

Physics Analyses as Main Contributor

- 2011-Present Significant contributions to multiboson physics in ATLAS, including precision tests of the Standard Model and searches for new phenomena:

Searches for new physics beyond the Standard Model

- Searches for heavy diboson resonances at $\sqrt{s} = 13$ TeV, 2015-2016, published in JHEP 09 (2016) 173.
- Search for high mass Higgs with $H \rightarrow ZZ$ channel at $\sqrt{s} = 8$ TeV, 2013-2015, published in EPJC 76 (2016) 45.
- Search for dark matter produced in association with a hadronically decaying vector boson (mono- V) at $\sqrt{s} = 13$ TeV, 2017-2018, published in JHEP 10 (2018) 180.
- Search for dark matter with mono- Z events at $\sqrt{s} = 8$ TeV, 2013-2014, published in PRD 90, 012004 (2014).

Higgs boson properties measurements

- Higgs off-shell coupling measurements and constraints on the Higgs total width at $\sqrt{s} = 8$ TeV, 2014-2015, published in EPJC (2015) 75:335.
- Spin and parity measurement of the Higgs boson in $H \rightarrow ZZ \rightarrow 4\ell$, 2012-2013, published in PLB 726 (2013) 120.

- Search for invisible decays of a Higgs boson produced in association with a Z boson, 2012-2013, published in PRL 112, 201802 (2014).

Measurements of electroweak interactions

- Measurement of the four-lepton invariant mass spectrum at $\sqrt{s} = 8$ TeV, 2017-2019, published in JHEP 04 (2019) 048.
- ZZ production cross section measurement at $\sqrt{s} = 8$ TeV, 2014-2016, published in JHEP 01 (2017) 099.
- Measurements of four-lepton production at the Z resonance at $\sqrt{s} = 7$ and 8 TeV, 2013-2014, published in PRL 112, 231806 (2014).
- ZZ production cross section measurement at $\sqrt{s} = 7$ TeV, 2011-2012, published in JHEP 03 (2013) 128.

Professional Service and Committees

2017-Present Member, Analysis Review Committee in ATLAS:

- Generic search for new physics in three or four leptons with full Run 2 data, EXOT-2019-36.
- $WW+1\text{jet}$ cross-section measurements with full Run 2 data, STDM-2018-34.
- Search for heavy Majorana or Dirac neutrinos and right-handed W gauge bosons in final states with two charged leptons and two jets, published in JHEP 01 (2019) 016.
- Search for resonances in the mass distribution of jet pairs with full Run 2 data, published in JHEP 03 (2020) 145.
- Search for dijet resonances in events with an isolated lepton with full Run 2 data, published in JHEP 06 (2020) 151.

2018.4 Session chair, Off-shell, ATLAS Higgs to ZZ workshop, University of Oxford, UK

2017.11 Session chair, VV/Vh semileptonic, ATLAS DBL-HBSM joint workshop, LAPP, Annecy, France.

2016.4 Session chair, $H \rightarrow ZZ \rightarrow \ell\ell qq/\nu\nu qq$, ATLAS Higgs to ZZ workshop, Max-Planck-Institut für Physik, Germany.

Teaching and Mentorship

- 2015-2020 Yicheng Guo, joint Michigan-USTC PhD student, supervising his thesis work, including searches for heavy resonances in $\nu\nu qq$ final states, searches for dark matter produced in association with a hadronically decaying vector boson (mono- V).
- 2016-2020 Heling Zhu, joint BNL-USTC PhD student, supervising her thesis work, including study of off-shell Higgs couplings, vector boson scattering in semileptonic final states, and Higgs properties measurements in 4ℓ final states.
- 2016-2020 Andrey Ryzhov, PhD student from IHEP Protvino, supervising his thesis work, including searches for heavy resonances in $\ell\ell qq$ final states, and vector boson scattering in semileptonic final states.

Selected Conference, Seminar and Workshop Presentations

Invited Seminars

- 2019.3 **Seminar**, Fermilab LHC Physics Center, Topic of the Week, Batavia, IL, USA. *Probing New Physics and the Nature of the Higgs Boson at ATLAS.*
- 2019.3 **Seminar**, Argonne National Lab, HEP Division Seminar, Lemont, IL, USA. *Probing New Physics and the Nature of the Higgs Boson at ATLAS.*
- 2019.2 **Seminar**, Stony Brook University, Particle Physics Seminar, Stony Brook, NY, USA. *Probing New Physics and the Nature of the Higgs Boson at ATLAS.*
- 2019.2 **Seminar**, Brookhaven National Lab, Particle Physics Seminar, Upton, NY, USA. *Probing New Physics and the Nature of the Higgs Boson at ATLAS.*
- 2017.12 **Seminar**, Institute of High Energy Physics, Beijing, China. *Measurements of Higgs boson properties and searches for new physics in HZZ with the ATLAS detector.*
- 2017.12 **Seminar**, Shanghai Jiao Tong University & T. D. Lee Institute, Shanghai, China. *Measurements of Higgs boson properties and searches for new physics in HZZ with the ATLAS detector.*
- 2017.12 **Seminar**, Shandong University, Jinan, China. *Measurements of Higgs boson properties and searches for new physics in HZZ with the ATLAS detector.*
- 2017.12 **Seminar**, USTC, Hefei, China. *Measurements of Higgs boson properties and searches for new physics in HZZ with the ATLAS detector.*

Conference Talks

- 2019.7 **Higgs Hunting 2019**, Paris, France. *Higgs studies on full Run2 differential measurements.*
- 2017.3 **La Thuile 2017**, 31st Les Rencontres de Physique de la Vallée d'Aoste, La Thuile, Aosta Valley, Italy. *Production of the Quarkonia States with the ATLAS Detector.*
- 2017.1 **BTTB 2017**, 5th Beam Telescopes and Test Beams Workshop, Barcelona, Spain. *Integration of MIMOSA26 sensors into a FEI4 planar sensor telescope.*
- 2015.7 **EPS-HEP 2015**, European Physical Society Conference on High Energy Physics, Vienna, Austria. *The Inclusive four-lepton lineshape measurement from pp collisions at 8 TeV with ATLAS.*
- 2013.8 **LPC Workshop on Gauge Boson Couplings 2013**, Fermilab, Batavia, IL, US. *ATLAS results on gauge coupling measurements.*
- 2013.8 **DPF 2013**, Meeting of the American Physical Society (APS) Division of Particles and Fields, UC Santa Cruz, CA, US. *Search for invisible decays of a Higgs boson produced in association with a Z boson in ATLAS.*
- 2013.4 **APS 2013**, APS April Meeting, Denver, CO, US. *Measurement of the ZZ production cross section in 20.7fb^{-1} of proton-proton collisions at $\sqrt{s} = 8\text{TeV}$ with the ATLAS detector.*