Baojia(Tony) Tong

Harvard University
Department of Physics
17 Oxford Street
Cambridge, MA 02138

baojia.tong@fas.harvard.edu
Web: http://btong.web.cern.ch/btong/
Skype: baojia.tong
Phone: +1 (617) 710-9767

Education

Harvard University, Massachusetts, MA
Ph.D., Physics, expected 2017
M.A., Physics, 2014
Committee: Profs. Melissa Franklin (Adviser), Masahiro Morii, Howard Georgi

California Institute of Technology, California, CA
B.A. with honors, Physics, 2012

Research Interests

Searches for new physics with the Higgs Boson
Multi-boson production and measurement
Charged particle prompt reconstruction
Detector operation, monitoring, and upgrade development

Research Experience

Harvard University

Analyzer, $X \to$ boosted $hh \to b\bar{b}b\bar{b}$ using ATLAS 13TeV data	2015-present
Developer, Improvement of Segment Seeding in Muon Reconstruction	2015-2016
Co-developer, Offline Data Quality Software for Muon Reconstruction	2015-2016
Expert and organizer, Offline Muon Data Quality Monitoring	2015
Analyzer, Prospective study of $hh \to WW\tau\tau$ for High Lumi LHC	2014
Calibration of Prototype Micromegas Chambers at Harvard	2014
Study of Muon Segments in ATLAS detector using 8TeV data	2012-2013

California Institute of Technology

Study of Vector Boson + Jets using CMS 8TeV data	2011-2012
Design and validation of an optical sensor for telescopes	2009-2010
Experiment design and study of market convergence	2009-2010
Modeling on novel methods of space launching	2008-2009

Detailed Research Contributions

Analysis

Search for $X \to$ boosted $hh \to b\bar{b}b\bar{b}$ using ATLAS 13TeV data

- Devised signal regions, improved search sensitivities especially for high mass signals
- Developed data-driven background estimation methods
- Validated signal MC simulations
- Updated software framework, produced analysis ntuples
- Selected and validated analysis trigger, optimized event selection
- Evaluated systematics for detector responses and data-driven methods
- Calculated asymptotic exclusion limits
- Drafted supporting documents, produced event displays

Prospective study of $hh \to WW\tau\tau$ for the HL-LHC

- Designed signal regions and event selections
- Tested multivariate analysis methods and increased signal sensitivities
- Predicted cut-based and multivariate analysis combined significances

Hardware

Prototype Micromegas Tests

- Calibrated charge and timing of prototype chambers
- Assisted cosmic muon data taking
- Analyzed and measured cosmic muon charge and timing distriubutions

Software

Muon Reconstruction

- Created parabolic road extrapolation for raw hits selection
- Resolved bugs in previous road extrapolation

Muon Monitoring

- Developed, updated, and maintained Muon Performance Monitoring packages
- Designed and maintained offline Muon Performance Monitoring Displays
- Improved and maintained offline Muon Detector and Performance Monitoring algorithms
- Maintained Muon Performance Monitoring packages for prompt online monitoring

Operation

Muon Data Quality

- Organized weekly meetings on offline software updates and data quality status
- Coordinated offline Muon Detector Monitoring software updates
- Created offline shifter training materials and instructions
- Created webpages for offline shifter records
- Communicated between detector and performance experts

Shifts

- Conducted online ATLAS Control Room Shifts: Muon Desk, Data Quality Desk
- Conducted offline Muon Data Quality Shifts: sign-offs
- Conducted offline Expert Shifts: assisted shifters as on-call expert for MDQ shifts

Publications and Talks (with links)

Paper

Search for pair production of Higgs bosons in the $b\bar{b}b\bar{b}$ final state at ATLAS — 2016

Public Notes

ATLAS-CONF-2016-049, $hh \to 4b$, ATLAS 13TeV, 13 fb^{-1} — 2016 summer
ATLAS-CONF-2016-083, $vh \to qqbb$, ATLAS 13TeV, 13 fb^{-1} — 2016 summer
ATLAS-CONF-2016-017, $hh \to 4b$, ATLAS 13TeV, 3 fb^{-1} — 2016 spring

Public Talks

Search for di-Higgs production with ATLAS, Higgs Couplings, SLAC — 2016
ATLAS $hh \to 4b$ ICHEP Results, Higgs Boson and BSM, Weihai, China — 2016

Selected ATLAS Talks

$hh \to 4b$, analysis ICHEP ATLAS Approval — 2016
$hh \to 4b$, analysis ICHEP Exotics Approval — 2016
$hh \to 4b/bb\tau\tau/bbWW$, Exotics Workshop, Grenoble — 2016
Muon Segment Seeding, Muon Week, Software — 2016
Muon Hough Transform Tuning, Muon Week, Software — 2015
Muon Spectrometer and DQ Status, ATLAS Weekly — 2015
Muon DQ 2015 Summary, Muon Week, Operations — 2015
Muon DQ Pre Run II Status, Muon Week, Operations — 2015

Teaching Experience

Physics Department, Harvard University

Guided summer student Gray Putnam's research — 2016
Guided summer student Michael Albergo's research — 2015
Teaching Fellow, Physics 125, Widely Applied Physics, Qscore 4.33/5 — 2014
Teaching Fellow, Physics 16, Classical Mechanics and Relativity, Qscore 4.47/5 — 2013

Physics Department, California Institute of Technology

Teaching Assistant, Physics 50, Physics League — 2011-2012

Honors

Harvard White Teaching Prize for Physics 16 — 2014
Harvard Traveling Scholar — 2015-2016
Caltech Undergrad Summer Research Fellowship — 2009-2012

Languages and Skills

Chinese (native), English (proficient), French (elementary)
C++, HTML, LaTeX, Matlab, Mathematica, Python, ROOT

References

Dr. Christoph Amelung
Physics Department
Brandeis University
christoph.amelung@cern.ch
+41 (22) 767-1695

Professor Melissa Franklin
Physics Department
Harvard University
franklin@physics.harvard.edu
+1 (617) 495-2909

Dr. Michael Kagan
Physics Department
Stanford Linear Accelerator Center
mkagan@cern.ch
+41 (75) 411-1923

Professor Mel Shochet
Physics Department
University of Chicago
shochet@hep.uchicago.edu
+1 (773) 702-7440