

Dr. Matthew S. Rudolph

201 Physics Building • Syracuse University • Syracuse, NY 13244
+1 (315) 443-3895 • msrudolp@syr.edu

Academic positions

- **Syracuse University** **Syracuse, NY**
Assistant Professor *2015 – present*
- **University of Toronto** **Toronto, ON, Canada**
Research Associate *2011 – 2015*

Education

- **Massachusetts Institute of Technology** **Cambridge, MA, USA**
PhD Particle Physics *2005 – 2011*
 - Thesis title: *Measurement of $\Upsilon(1S)$ spin alignment with the CMS detector*
 - **Johns Hopkins University** **Baltimore, MD, USA**
BS Physics, BA Math *2001 – 2005*
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Research experience and interests

- LHCb Collaboration at Large Hadron Collider 2015 – present
 - Precision physics measurements
 - * Lepton flavor non-universality
 - * Exotic hadronic states
 - Upstream Tracker upgrade
 - * Coordination of silicon sensor production and characterization
- ATLAS Collaboration at Large Hadron Collider 2011 – 2015
 - Top Quark Physics
 - * Organized analysis effort and edited paper in Physical Review Letters for first measurement of top quark polarization in top–antitop quark pair events
 - * Acted as liaison for Top Physics Group for Missing Transverse Energy; responsible for general group prescriptions
 - Vertex reconstruction
 - * Implemented new vertex seed algorithm inspired by medical imaging

- * Developed and maintained truth matching algorithm for performance studies in simulation
- Diamond Beam Monitor upgrade
 - * Responsible for software development including simulation and reconstruction
- CMS Collaboration at Large Hadron Collider 2005 – 2011
 - Heavy flavor physics
 - * Spearheaded effort to measure spin alignment of $\Upsilon(1S)$ mesons in early data.
 - * Involved in first analyses for J/ψ and Upsilon particles.
 - Tracking
 - * Introduced improvements to track reconstruction software and material modeling to reduce momentum bias.
 - * Studied details of tracker material distribution using GEANT4 software.
 - Tracking detector
 - * Participated in commissioning of silicon strip tracker. Operated tracker data acquisition system in special modes and analyzed output in order to calibrate and prepare the system.
- CDF Collaboration at Tevatron 2003 – 2005
 - Involved in early analysis search for decay $B^0 \rightarrow \phi K_S$

Selected publications

- ATLAS Collaboration. *An imaging algorithm for vertex reconstruction for ATLAS Run-2.* ATL-PHYS-PUB-2015-008 (2015) URL: <http://cds.cern.ch/record/2008700>.
- ATLAS Collaboration. *Measurement of Top Quark Polarization in Top-Antitop Events from Proton-Proton Collisions at $\sqrt{s} = 7$ TeV Using the ATLAS Detector.* Phys.Rev.Lett. 111.23 (2013) 232002. DOI: 10.1103/PhysRevLett.111.232002. arXiv: 1307.6511 [hep-ex].
- CMS Collaboration. *Measurement of the $Y(1S)$, $Y(2S)$ and $Y(3S)$ polarizations in pp collisions at $\sqrt{s} = 7$ TeV.* Phys.Rev.Lett. 110 (2013) 081802. DOI: 10.1103/PhysRevLett.110.081802. arXiv: 1209.2922 [hep-ex].
- ATLAS Collaboration. *Measurement of top quark polarisation in $t\bar{t}$ events with the ATLAS detector in proton-proton collisions at $\sqrt{s} = 7$ TeV.* ATLAS-CONF-2012-133 (2012)
- Grimm, K. et al. *Methods to quantify the performance of the primary vertex reconstruction in the ATLAS experiment under high luminosity conditions.* J.Phys.Conf.Ser. 396 (2012) 022041. DOI: 10.1088/1742-6596/396/2/022041.

CMS Collaboration. *Measurement of the Inclusive Υ production cross section in pp collisions at $\sqrt{s} = 7$ TeV*. Phys.Rev. D83 (2011) 112004. doi: 10.1103/PhysRevD.83.112004. arXiv: 1012.5545 [hep-ex].

CMS Collaboration. *Measurement of Momentum Scale and Resolution of the CMS Detector using Low-mass Resonances and Cosmic Ray Muons*. CMS-PAS-TRK-10-004 (2010)

CMS Tracker Collaboration. *Performance studies of the CMS Strip Tracker before installation*. JINST 4 (2009) P06009. doi: 10.1088/1748-0221/4/06/P06009. arXiv: 0901.4316 [physics.ins-det].

Conference Presentations

Top Quark Property Measurements with ATLAS. Les Rencontres de Physique de la Vallée d'Aoste, La Thuile, 1-7 March 2015.

Standard Model Measurements with ATLAS. Canadian Association of Physicists Congress, 16-20 June 2014.

Top production and properties measurements in ATLAS. Lake Louise Winter Institute, 17-23 February 2013.

Quarkonium production in pp collisions at the LHC. Brookhaven Summer Program on "Quarkonium Production in Elementary and Heavy Ion Collisions", 6-18 June 2011

Student Presentations

Measurement of Upsilon(1S) polarization using CMS. American Physical Society Meeting, 30 April-3 May, 2011

J/ ψ and Upsilon Production at CMS. Implications of First LHC Data: MIT-Berkeley Workshop, 10-13 August, 2010.

Additional education

- Participant in Excellence in Detectors and Instrumentation Technologies (EDIT) Symposium. Fermilab, February 13-24, 2012.