

## SABINE W. LAMMERS

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### Education and Employment:

2008 - present	<b>Assistant Professor of Physics</b>	Indiana University
2013 - 2014	<b>Eleanor Trefftz Guest Professor</b>	Technische Universität Dresden
2009	<b>Guest Scientist</b>	Fermi National Accelerator Center
2004 - 2008	<b>Research Associate</b>	Columbia University
2004	Ph.D., Physics	University of Wisconsin
1997-1998	DESY Internship	ZEUS Experiment
1997	B.A., Physics	Barnard College

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## Research

### ATLAS Experiment (2011 – present)

- **Phase I Trigger and Data Acquisition Upgrade: Level-3 Manager.** Management of algorithm firmware that will run in Level 1 Calorimeter Trigger Phase I Upgrade of the ATLAS Detector, scheduled for commissioning in 2018. Primary responsibilities include ensuring timely delivery of algorithm firmware that will run on the gFEX trigger board, facilitating communication between physicists who design algorithms and engineers who implement them in firmware, and supervising students and postdocs who contribute to the design and simulation of the algorithms.
- **Electroweak Vector Boson Fusion Production.** Initiated measurement of Vector Boson Fusion (VBF) production of W Bosons at ATLAS. Lead supervisor for analysis team, and currently supervising 2 graduate students who contribute to the analysis. Vector Boson Fusion is an Electroweak interaction in which Vector Bosons couple, making it sensitive to anomalous triple and quartic gauge couplings. Main challenges of the analysis include reducing systematic uncertainties from measurements of accompanying jets that are widely separated in polar angle, and often enter the forward region of the detector.
- **Jet Energy Scale Corrections** Contributed to the measurement of the Jet Energy Scale (JES) and associated uncertainties for 2012 data. Specific contributions included co-editing V+jets in-situ JES corrections conference note and paper (in progress) and supervising student who employed Z-jet balance method to reduce JES uncertainties in the forward region of the detector.
- **Muon Trigger Expert and Shifter** Developed method for measuring single muon and dimuon trigger efficiencies for 2012 data. Took B-Trigger/Muon expert shifts as part of ATLAS authorship qualification requirements.

## DØ Experiment (2004 – present)

- **QCD Physics Group Co-convenor (2009 – 2011)** Served as one of two convenors for QCD Physics Group, shepherding eight measurements through to publication.
- **Measurements of W Boson Production in Association with Jets** Initiated and led a new set of measurements of W+jet(s) production using DØ data collected in Run II. Over forty distributions were measured and compared to leading theoretical predictions, thereby testing the theory of QCD in a comprehensive manner. The measurements were the most precise of their time, and were published in Physics Letters B and Physics Review D. A primary motivation for these measurements was to reduce systematic uncertainties on the modeling of strongly produced W+2jet events, which comprise the primary background for Vector Boson Fusion W production.
- **Trigger Studies Group Co-convenor (2006 – 2008)** Served as one of two convenors of the Trigger Studies working group, which provided trigger efficiency measurements and associated uncertainties for most triggers used by Higgs, Top, Electroweak and QCD physics analyses.
- **Level-1 Calorimeter Trigger Upgrade** Leader of the simulation effort for the RunIIb Level-1 Calorimeter upgrade. Sliding windows clustering algorithms were programmed in FPGAs using custom digital electronics, in order to improve the sharpness of trigger turnon curves for electrons, photons, taus and jets. This allowed DØ to take full advantage of the large increase in statistical power provided by the Tevatron in RunIIb. Additional activities included contributing to the commissioning of the system, ensuring the performance of the algorithms in first data, and supervising students who contributed.
- **DØ Advisory Council (2006 – 2008)** Elected member of the DØ Advisory Council, which advises the experiment's leadership on a broad range of issues.
- **Run II Editorial Board 030 Member (2007 – 2009)** Reviewed and edited manuscripts that led to five publications of measurements and searches in top quark pair final states.
- **Shift Leader, Data Acquisition and Calorimeter Shifter** Performed variety of detector sub-component shifts that ensured efficient collection of data provided by the Tevatron Collider.

## ZEUS Experiment (2000 – 2006)

- **Level-1 Calorimeter Trigger Expert and Shifter** Calibrated and maintained ZEUS Level-1 calorimeter in good working order.
- **Trigger Coordinator for Hadronic Final States Working Group** Designed triggers for collecting events with jets, and measured their efficiencies.
- **Jet Energy Scale Uncertainty** Measured systematic uncertainty on dijet production cross section in deep inelastic scattering due to jet energy scale in publication [11].
- **Forward Jets** Data analysis of inclusive forward jet cross sections which culminated in a PhD thesis entitled "A Study of Parton Dynamics at Low x with ZEUS at HERA."

## Teaching

- Spring 2014: Physics II, non-calculus based (P202)
- Fall 2013: Teilchen und Kernphysik (Particle and Nuclear Physics, P535 equivalent), TU-Dresden
- Spring 2013: Physics II, non-calculus based (P202)
- Fall 2012: Introduction to Modern Physics (P301)
- Spring 2012: Physics II, non-calculus based (P202)
- Spring 2011: Physics for Poets - Understanding the Invisible Universe (P114)
- Fall 2010: Physics for Poets - Space and Time (E105)
- Spring 2009: Physics II, calculus based (P222)
- Fall 2008: Physics I, calculus based (P221)
- Supervision of two postdocs, two graduate students and four undergraduate students (2007-present).

## Service, Outreach and Leadership

- Chair, Local Organizing Committee for PIC 2014 International Symposium.
- Member, Local Organizing Committee for 2013 Anomalous Quartic Gauge Couplings Workshop, TU Dresden.
- Member, Local Organizing Committee for 2014 Multi-Boson Interactions Workshop, BNL.
- Interview with German Radio Station FIGARO on Status of Women in Physics (2013).
- Lecture on LHC Physics for Faculty and Students of TU-Dresden (2013).
- Presenter at 2013 IU miniUniversity.
- Co-convenor, Chicago 2012 Workshop on LHC Physics.
- Co-convenor, QCD & HFS Working Group of DIS2011.
- Co-convenor, QCD Parallel Sessions of EPS HEP2011
- Organized IU High Energy and Astrophysics weekly seminars (2008-2013).
- Faculty Liason to Advanced College Project (ACP) for Physics (2010-present).
- Reviewed Proposal for UK STFC Advanced Fellowship (2011).
- Co-organizer, Kavli Frontiers of Science Symposium (2010-2011).
- Reviewer, Physics Letters B.
- Panel member for EU sponsored “Ask-a-Scientist” session at University of Mainz, via video link (2007).
- Various presentations on elementary physics to school students in their classrooms, as part of IU Annual Physics Open House, and DOE sponsored events (2004-present).
- Tour Guide at “Tag der Öffenen Tür” community outreach event at DESY (2003).

# Publications

The following are a list of refereed publications in which I made a direct contribution as author or editor. A complete list of all publications can be found on my webpage.

1. [P0] G. Aad *et al.* [ATLAS Collaboration], “Measurement of Electroweak W production in associated with jets at high dijet mass,” (in preparation).
2. [P1] V. M. Abazov *et al.* [D0 Collaboration], “Studies of W boson plus jets production in ppbar collisions at  $\sqrt{s}=1.96$  TeV,” Phys. Rev. D **88**, 092001 (2013) [arXiv:1302.6508 [hep-ex]].
3. [P2] V. M. Abazov *et al.* [D0 Collaboration], “Measurements of inclusive W+jets production rates as a function of jet transverse momentum in ppbar collisions at  $\sqrt{s}=1.96$  TeV,” Phys. Lett. B **705**, 200 (2011) [arXiv:1106.1457 [hep-ex]].
4. [P3] V. M. Abazov *et al.* [D0 Collaboration], “Measurement of the inclusive jet cross section in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Rev. D **85**, 052006 (2012) [arXiv:1110.3771 [hep-ex]].
5. [P4] V. M. Abazov *et al.* [D0 Collaboration], “High mass exclusive diffractive dijet production in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Lett. B **705**, 193 (2011) [arXiv:1009.2444 [hep-ex]].
6. [P5] V. M. Abazov *et al.* [D0 Collaboration], “Measurement of three-jet differential cross sections  $d\sigma_{3jet}/dM_{3jet}$  in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Lett. B **704**, 434 (2011) [arXiv:1104.1986 [hep-ex]].
7. [P6] V. M. Abazov *et al.* [D0 Collaboration], “Azimuthal decorrelations and multiple parton interactions in photon+2 jet and photon+3 jet events in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Rev. D **83**, 052008 (2011) [arXiv:1101.1509 [hep-ex]].
8. [P7] V. M. Abazov *et al.* [D0 Collaboration], “A measurement of the ratio of inclusive cross sections  $\sigma(p\bar{p} \rightarrow Z + b\text{jet})/\sigma(p\bar{p} \rightarrow Z + \text{jet})$  at  $\sqrt{s} = 1.96$  TeV,” Phys. Rev. D **83**, 031105 (2011) [arXiv:1010.6203 [hep-ex]].
9. [P8] V. M. Abazov *et al.* [D0 Collaboration], “Measurement of direct photon pair production cross sections in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Lett. B **690**, 108 (2010) [arXiv:1002.4917 [hep-ex]].
10. [P9] V. M. Abazov *et al.* [D0 Collaboration], “Measurement of the dijet invariant mass cross section in  $p\bar{p}$  collisions at  $\sqrt{s} = 1.96$  TeV,” Phys. Lett. B **693**, 531 (2010) [arXiv:1002.4594 [hep-ex]].
11. [P10] V. M. Abazov *et al.* [D0 Collaboration], “Double parton interactions in photon+3 jet events in  $pp^-$  bar collisions  $\sqrt{s} = 1.96$  TeV,” Phys. Rev. D **81**, 052012 (2010) [arXiv:0912.5104 [hep-ex]].

12. [P11] M. Abolins *et al.*, “Design and Implementation of the New D0 Level-1 Calorimeter Trigger”, Nucl. Inst. and Methods **A 584/1**, 75 (2007) [arXiv:0709.3750/physics.ins-det].
13. [P12] S. Chekanov *et al.* [ZEUS Collaboration], “Forward jet production in deep inelastic ep scattering and low-x parton dynamics at HERA,” Phys. Lett. B **632**, 13 (2006)
14. [P13] S. Chekanov *et al.* [ZEUS Collaboration], “Dijet production in neutral current deep inelastic scattering at HERA”, Eur. Phys. J. C **23**, 13 (2002) [arXiv:hep-ex/0109029].

## Conference Papers and Proceedings

1. [C1] DØ Collaboration, “Measurements in W+jets production at  $\sqrt{s}=1.96$  TeV.” Conference paper submitted to Physics for the LHC (PLHC) Conference. June, 2012.
2. [C2] S. Lammers (for CDF and DØ Collaborations), “W/Z/gamma + jets and W/Z/gamma + heavy flavor at the Tevatron,” PoS HCP **2009**, 010 (2009).
3. [C3] S. Lammers (for DØ Collaboration), “Measurements of Differential Z/gamma\* +jet +X Cross Sections with the D0 Detector,” DPF2009 Conference Proceedings. arXiv:0911.1380 [hep-ex].
4. [C4] ZEUS Collaboration, “Parton Evolution at Low  $x$  at ZEUS.” Conference paper submitted to European Physical Society (EPS) Annual Meeting. July, 2003.
5. [C5] S. Lammers (for ZEUS Collaboration), “ZEUS Forward Jets in Deep Inelastic Scattering”, DIS2003 Conference Proceedings. June, 2003.
6. [C6] C. F. Berger *et al.*, “Snowmass 2001: Jet energy flow project”, *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. N. Graf, eConf **C010630**, P512 (2001) [arXiv:hep-ph/0202207].
7. [C7] G. Fleming, E. Kinney, S. Lammers and S. Magill, “Future Possibilities for Lepton Hadron Collider Physics and Detector.” in *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. N. Graf, eConf **C010630**, E406 (2001) [arXiv:hep-ex/0201045].
8. [C8] T. Adams *et al.*, “Young Physicist’s Forum”, *Proc. of the APS/DPF/DPB Summer Study on the Future of Particle Physics (Snowmass 2001)* ed. N. Graf, Snowmass, Colorado, 30 Jun - 21 Jul 2001, [arXiv:hep-ex/0110027]

## Conference Talks and Invited Seminars

1. “Fusion and Scattering of Electroweak Bosons”, Seminar at University of Göttingen, Jan 2014

2. “High Energy Tests of the Electroweak Theory”, Colloquium at TU-Dresden, Jan 2014
3. “Forward Jet Studies for VBF/VBS”, ATLAS VBF/VBS Jamboree @BNL, Nov 2012
4. “W/Z + jets Measurements at the Tevatron”, QCD@LHC Workshop @MSU, Aug 2012
5. “Tevatron QCD and Electroweak Results”, Fermilab Users Meeting, Jun 2011
6. “Recent Results on QCD from  $D\bar{0}$ ”, CERN Seminar, Jun 2010
7. “ $D\bar{0}$  Studies of V+Jets”, MC4LHC Workshop, CERN, Apr 2010
8. “Vector Boson + Jets Measurements at the Tevatron”, Plenary Talk at HCP2009, Nov 2009
9. “MEPS Comparisons with Tevatron Data” Physics for the LHC, Split, Croatia, Oct 2008
10. “High Mass Higgs Searches at the Tevatron” Aspen Winter Institute, Colorado, Feb 2008
11. “Standard Model Higgs Searches at  $D\bar{0}$ ” Lake Louise Winter Institute, Canada, Feb 2006
12. “ZEUS Forward Jets in Deep Inelastic Scattering” DIS03, St. Petersburg, Russia. Apr 2003
13. “Inclusive Jet Production in DIS at ZEUS” APS Division of Particles and Fields Annual Meeting, Mar 2003
14. “Asymmetric Jet Cuts in Dijet Analyses at ZEUS” XXXVII Recontres de Moriond, Les Arcs, France, Feb 2002
15. “Snowmass Summary Report, Subgroup D: Lepton-Hadron Colliders.” Snowmass Workshop, Aug 2001

## Grants and Awards

- Eleanor Trefftz Fellowship (TU-Dresden) (2013)
- OVPR Research Leave Supplement (2013-2014)
- DOE Grant DE-FG02-91ER40661 (2013-2016)
- DOE Individual Investigator Grant DE-FG02-12ER41821 (2012)
- Kavli Fellow
- URA Travel Grant (2010)
- Fermilab Sabbatical (2009)
- SLAC Panofsky Fellowship (2008) (declined)

**Languages:** English (native), German (good), Italian (rudimentary)

## Collaborators and Other Affiliations:

$D\bar{0}$ : <http://www-d0.fnal.gov/author/authorlist.html>

ATLAS: <http://atlas.web.cern.ch/Atlas/index.html>

## Graduate and Postdoctoral Advisors:

Allen Caldwell (DESY internship)

Wesley Smith (PhD)

Harold Evans, Gustaaf Brooijmans (postdoc)