

# Bodhitha A. Jayatilaka

## *Curriculum Vitae*

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## Education

Ph.D. Physics, University of Michigan, 2006.

*Advisor:* Prof. David Gerdes

*Dissertation:* "A Measurement of the Top Quark Mass in the Dilepton Decay Channel at CDF II"

M.S. Physics, University of Michigan, 2004.

B.A. Physics, University of California, Berkeley, 2002.

## Awards and Honors

**2012 Alvin Tollestrup Award** for postdoctoral research excellence. Awarded for "leadership and significant contribution to the measurement of the  $W$  mass with the CDF experiment."

## Research Experience

*Fermilab, Batavia, IL*

### **Applications Physicist I, Scientific Computing Division (2012-present)**

**Open Science Grid (OSG):** Area coordinator for production support (April 2015 - present). Head of group responsible for support of Virtual Organizations (VOs) using the OSG, new site integration coordination, and opportunistic resource gathering and delivery. Production Analyst (March 2014 - present). Responsible for large-scale analysis of the OSG, spanning over 100 sites, to optimize opportunistic usage across a wide range of scientific applications.

**Search for dark matter at CMS:** Performing searches for dark matter using the CMS experiment at CERN in the top quark+ $X$  final state. This search is being carried out using 13 TeV  $pp$  collision data with collaborators at MIT, Northwestern University, and CERN.

**Opportunistic computing for the CMS experiment:** Coordinating effort to use the Gordon supercomputer at SDSC to meet computing needs of the CMS collaboration. Expanding effort to generalized CMS computing at High Performance Computing (HPC) centers as well as cloud computing resources.

**Tevatron data preservation:** CDF project lead for data preservation (November 2012 - March 2014), devising and implementing a platform and continued plan for data analysis capability using the full Tevatron dataset through 2020. Two-year project funded by U.S. Dept. of Energy.

**CDF Standard Model Physics Group:** co-convener (January 2013 - June 2014). Co-leader of physics group for QCD and electroweak measurements at the CDF experiment. Responsible for analysis review and approval.

*Massachusetts Institute of Technology, Cambridge, IL*

**Visiting Scientist, Laboratory for Nuclear Science (2014-present)**

*Duke University, Durham, NC*

**Research Associate (2006-2012)**

*CDF Experiment*

**W boson mass measurement:** Helped complete first CDF II measurement of  $m_W$  resulting in the single most precise measurement of  $m_W$  to-date in 2006. Lead effort of subsequent measurement with  $2.2 \text{ fb}^{-1}$  of data. Resulted in a measurement of  $M_W = 80387 \pm 19 \text{ MeV}/c^2$ , significantly exceeding the precision of all prior measurements combined. Co-convener of  $W$  mass and width group since 2008. [Phys. Rev. Lett. **99**, 151801 (2007); Phys. Rev. D. **77**, 112001 (2008); Phys. Rev. Lett. **108**, 151803 (2012)]

**Search for  $ZH \rightarrow \ell^+ \ell^- b\bar{b}$ :** Began work in 2008, implementing matrix-element probabilities in this crucial low-mass standard model Higgs search channel and improving sensitivity by over 20%. Co-convener of  $ZH \rightarrow \ell^+ \ell^- b\bar{b}$  analysis group since 2009. [Phys. Rev. D **80**; 071101(R) (2009), Phys. Rev. Lett **105**, 251802 (2010); Phys. Lett. B **715**, 98 (2012); Phys. Rev. Lett. **109**, 11803 (2012); Phys. Rev. Lett. **109** 071804 (2012)]

**Search for New Physics in  $ZZ + \cancel{E}_T$ :** Performed search for 4th generation neutrinos in the  $ZZ + \cancel{E}_T$  final state in  $4 \text{ fb}^{-1}$  of data. [Phys. Rev. D **85**, 011104(R) (2012)]

**Top-quark mass measurement in dilepton channel:** Performed measurement of  $m_t$  in the statistics-limited dilepton channel producing the most precise measurement in this channel with a total uncertainty of 4 GeV. Implemented first application of neuroevolution in high energy physics. [Phys. Rev. D. **75** 031105(R) (2007); Phys. Rev. Lett. **102**, 152001 (2009)]

**Detector Operations Manager (2011):** Responsible for day-to-day operations of the CDF detector. Manage and oversee shift crew operations and establish data-taking priorities.

**Calibration Coordinator (2007-2008):** Responsible for offline calibration availability for the CDF experiment. Implemented and deployed software framework and tested infrastructure used in offline data processing at CDF.

*ATLAS Experiment*

**Standard Model Higgs Boson Search:** Adapting matrix-element-based probabilities for  $H \rightarrow W^+W^-$  searches at ATLAS.

**LHC Upgrade Studies:** Studying the physics reach of ATLAS in a high-luminosity and high-energy upgrade of the LHC.

*University of Michigan, Ann Arbor, MI*

**Graduate Student Research Assistant (2002-2006)**

*CDF Experiment*

**Top-quark mass measurement in dilepton channel:** Implemented first application of matrix-element probabilities in the kinematically underconstrained dilepton decay channel of top quark pairs. Achieved total uncertainty of 5.5 GeV. [Phys. Rev. Lett. **96**, 152002 (2006); Phys. Rev. D. **74**, 032009 (2006)]

**Top-quark cross-section measurement in dilepton channel:** Measured production cross section of top quark pairs in the dilepton decay channel. Performed the first  $b$ -tagged measurement in the top dilepton channel at CDF.

**Beamline measurement at CDF:** Developed and implemented software infrastructure used to calculate beam position, a crucial input to detector alignment and calibration, at CDF. This infrastructure has been in place at CDF and operational since 2004. [IEEE Trans. Nucl. Sci. **53**, 2897 (2006)]

**Upgrade of Time-to-Digital-Converters (TDCs) at CDF:** Tested, calibrated and upgraded TDCs used in central and muon tracking at CDF.

*Lawrence Berkeley Laboratory, Berkeley, CA*

**Research Associate (2002)**

**Student Research Assistant (2001-2002)**

*ATLAS Experiment*

**ATLAS semiconductor tracker (SCT) barrel detector development:** Performed long-term irradiation study of ATLAS SCT electronics. Implemented test and calibration procedures for first SCT modules produced and deployed from North America.

## Invited Conference and Seminar Presentations

“Data preservation at the Fermilab Tevatron,” DPF 2015, Ann Arbor, Michigan, USA, August 6, 2015

“Data preservation at the Fermilab Tevatron,” CHEP 2015, Okinawa, Japan, April 14, 2015

“The OSG open facility: A sharing ecosystem,” CHEP 2015, Okinawa, Japan, April 13, 2015

“ $M_W$ ,  $Z$   $A_{FB}$ , and  $W/Z$  Production,” LHCP 2014, New York, New York, USA. Invited plenary talk on behalf of the ATLAS, CMS, CDF, and DØ Collaborations. June 7, 2014.

“Tevatron data preservation,” Joint DASPOS/DPHEP workshop, CERN. March 21, 2013.

“Legacy electroweak results from the Tevatron,” Invited seminar, University of Cincinnati, November 19, 2013.

“Colliders and their window into the universe: the past, present, and future,” Invited colloquium, Saginaw Valley State University, February 19, 2013.

“Precision measurement of the  $W$  boson mass at CDF” Invited seminars: Argonne National Lab, March 28, 2012; University of California, Los Angeles, April 3, 2012; University of California, Irvine, April 4, 2012; SLAC National Accelerator Laboratory, May 8, 2012; Northwestern University, May 21, 2012; University of California, Davis, June 4, 2012; University of Notre Dame, September 4, 2012; Michigan State University, September 11, 2012; LAPP Annecy, October 5, 2012; University of Birmingham, October 10, 2012; University of Warwick, October 11, 2012; MIT, November 5, 2012; Harvard University, November 7, 2012; Wayne State University, February 15, 2013.

“Recent results from the Tevatron” 2nd MCTP Symposium on Higgs Boson Physics, Ann Arbor, Michigan USA. Invited Plenary talk on behalf of the CDF and DØ Collaborations. April 19, 2012.

“Measurement of the  $W$  boson mass at CDF” 2012 Rencontres de Moriond: Electroweak. La Thuile, Italy. Invited plenary talk on behalf of the CDF Collaboration. March 7, 2012.

“Precision measurement of the  $W$  boson mass at CDF” 2012 Les Rencontres de Physique de la Vallée d’Aoste. La Thuile, Italy. Invited plenary talk on behalf of the CDF Collaboration. March 1, 2012.

“Combination of Standard Model Higgs Boson searches at the Tevatron” 2011 Rencontres de Moriond: Electroweak. La Thuile, Italy. Invited plenary talk on behalf of CDF and DØ Collaborations. March 13, 2011.

“Searching for the Standard Model Higgs Boson at CDF” Invited seminars: Columbia University. New York, New York USA. March 31, 2010; University of California, Irvine. Irvine, California USA. June 2, 2010.

“Search for the Low Mass Standard Model Higgs Boson at the Tevatron” Aspen Particle Physics 2010. Aspen, Colorado USA. Invited plenary talk on behalf of the CDF and DØ Collaborations. January 19, 2010.

“Search for  $VH \rightarrow \cancel{E}_T + b\bar{b}$  at the Tevatron” Meeting of the APS Division of Particles and Fields. Detroit, Michigan USA. Invited talk on behalf of the CDF and DØ Collaborations. July 27, 2009.

“Tevatron Electroweak Results and Top Quark Properties” 42nd Annual Fermilab Users’ Meeting. Batavia, Illinois USA. Invited plenary talk on behalf of the CDF and DØ Collaborations. June 3, 2009.

“Precision Electroweak Measurements at the Tevatron” DIS 2009: 17th International Workshop on Deep-Inelastic Scattering and Related Subjects. Madrid, Spain. Invited talk on behalf of the CDF and DØ Collaborations. April 27, 2009.

“Top Quark Mass Measurements in the Dilepton and Alljets Channels” ICHEP 2008: 34th International Conference in High Energy Physics. Philadelphia, Pennsylvania USA. Invited talk on behalf of the CDF and DØ Collaborations. July 30, 2008.

“Precision Measurements of the Top Quark Mass in the Dilepton Channel” Top 2006, International Workshop on Top Quark Physics, Coimbra, Portugal. Invited plenary talk on behalf of CDF and DØ Collaborations. January 12, 2006.

## Selected List of Publications

I list here publications I have had major contribution to in the form of analysis, student mentorship or analysis review.

T. Aaltonen *et al.* (CDF Collaboration), “A precise measurement of the  $W$ -boson mass with the Collider Detector at Fermilab,” *Phys. Rev. D* **89**, 072003 (2014) [[arXiv:1311.0894](#)].

T. Aaltonen *et al.* (CDF and DØ Collaborations) “Combination of CDF and DØ  $W$ -boson mass measurements,” *Phys. Rev. D* **88**, 052108 (2013) [[arXiv:1307.7627](#)].

T. Aaltonen *et al.* (CDF and DØ Collaborations) “Evidence for a Particle Produced in Association with Weak Bosons and Decaying to a Bottom-Antibottom Quark Pair in Higgs Boson Searches at the Tevatron,” *Phys. Rev. Lett.* **109**, 071804 (2012). *PRL Editors’ Suggestion* [[arXiv:1207.6436](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Combined Search for the Standard Model Higgs Boson Decaying to a  $b\bar{b}$  Pair Using the Full CDF Data Set,” *Phys. Rev. Lett.* **109**, 111802 (2012). [[arXiv:1207.1707](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Search for the Standard Model Higgs Boson Decaying to a  $b\bar{b}$  Pair in Events with Two Oppositely Charged Leptons Using the Full CDF Data Set,” *Phys. Rev. Lett.* **109**, 11803 (2012). [[arXiv:1207.1704](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Search for the Standard Model Higgs Boson Produced in Association with a  $Z$  boson in  $7.9 \text{ fb}^{-1}$  of  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.96 \text{ TeV}$  Using the CDF II Detector,” *Phys. Lett. B* **715**, 98 (2012).

T. Aaltonen *et al.* (CDF Collaboration), “Precise Measurement of the  $W$  Boson Mass with the CDF II Detector,” *Phys. Rev. Lett.* **108**, 151803 (2012). *PRL Editors’ Suggestion*. [[arXiv:1203.0275](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Search for New Phenomena in Events with Two  $Z$  Bosons and Missing Transverse Momentum in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.96 \text{ TeV}$ ,” *Phys. Rev. D* **85**, 011104(R) (2012) [[arXiv:1112.1577](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Top Quark Mass Measurement in the Lepton + Jets Channel Using a Matrix Element Method and *in situ* Jet Energy Calibration,” *Phys. Rev. Lett.* **105**, 252001 (2010). [[arXiv:1010.4582](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Improved Search for a Higgs Boson Produced in Association with  $Z \rightarrow l^+l^-$  in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.96 \text{ TeV}$ ,” *Phys. Rev. Lett.* **105**, 251802 (2010). [[arXiv:1009.3047](#)]

T. Aaltonen *et al.* (CDF Collaboration), “A Search for the Higgs Boson Produced in Association with  $Z \rightarrow l^+l^-$  Using the Matrix Element Method at CDF II,” *Phys. Rev. D* **80**, 071101(R) (2009). [[arXiv:0908.3534](#)]

T. Aaltonen *et al.* (CDF Collaboration), Top Quark Mass Measurement in the  $t\bar{t}$  All Hadronic Channel Using a Matrix Element Technique in  $p\bar{p}$  Collisions at  $\sqrt{s} = 1.96 \text{ TeV}$ ,” *Phys. Rev. D* **79**, 072010 (2009). [[arXiv:0811.1062](#)]

T. Aaltonen *et al.* (CDF Collaboration), “Measurement of the Top-Quark Mass with Dilepton Events Selected Using Neuroevolution at CDF,” *Phys. Rev. Lett.* **102**, 152001 (2009). [[arXiv:0807.4652](#)]

T. Aaltonen *et. al.* (CDF Collaboration), "First Run II Measurement of the  $W$  Boson Mass at the Fermilab Tevatron," *Phys. Rev. D.* **77**, 112001 (2008). [[arXiv:0708.3642](#)]

T. Aaltonen *et. al.* (CDF Collaboration), "First Measurement of the  $W$  Boson Mass in Run II of the Tevatron," *Phys. Rev. Lett.* **99**, 151801 (2007). [[arXiv:0707.0085v1](#)]

A. Abulencia, *et. al.* (CDF Collaboration), "Precision Measurement of the Top-Quark Mass from Dilepton Events at CDF II," *Phys. Rev. D.* **75** 031105(R) (2007). [[hep-ex/0612060](#)]

A. Abulencia, *et. al.* (CDF Collaboration), "Top-Quark Mass Measurement from Dilepton Events at CDF II," *Phys. Rev. Lett.* **96**, 152002 (2006). [[hep-ex/0512070](#)]

A. Abulencia, *et. al.* (CDF Collaboration), "Top-Quark Mass Measurement from Dilepton Events at CDF II Using the Matrix-Element Method," *Phys. Rev. D.* **74**, 032009 (2006). [[hep-ex/0605118](#)]

J. Antos, *et. al.*, "Data Production Models for the CDF Experiment," *IEEE Trans. Nucl. Sci.* **53** 2897 (2006). [[hep-physics/0606042](#)]

In addition to the above, I have been a member of the CDF collaboration author list since January 2005 and the CMS collaboration author list since August 2015 with over 380 publications and more than 19,000 citations.