

Andrew C. Haas  
October 21, 2007

Prof. Torgny Gustafsson, Chair  
Department of Physics and Astronomy, Rutgers University  
136 Frelinghuysen Road  
Piscataway, NJ 08854-8019

Dear Selection Committee,

Please accept this letter and accompanying material as application for your position as Assistant Professor of Experimental High-Energy Physics. For the past four years I have been a post-doc with the experimental high-energy physics group at Columbia University, working on the DZero experiment at the Fermilab Tevatron and the ATLAS experiment at CERN's Large Hadron Collider (LHC). This position has given me the opportunity to continue to analyze new data from the world's currently highest-energy accelerator, while contributing to and preparing for an exciting new experiment that will soon be collecting data at a much greater energy.

I am fascinated by fundamental particle interactions and enjoy greatly working on experiments that help to understand them better, as well as search for new physics. Perhaps the most interesting open question in particle physics today is how electro-weak symmetry is broken: how do the W and Z bosons get their mass? And why are these masses so small compared to the fundamental energy scale? DZero has the exciting possibility to address these questions, and ATLAS is nearly guaranteed to provide the answers. The leading candidate theory is a light Higgs boson and the presence of Supersymmetry. I have completed several analyses using data from DZero that address these issues. I pioneered a search at DZero for Higgs bosons in the context of Supersymmetry that takes advantage of DZero's new ability to identify hadronic bottom-quark jets. And I devised a way to observe the decays of Z bosons to bottom-quark jets, an important step towards observing the Higgs boson. Then I looked for evidence of a new long-lived particle that would be a sign of split-Supersymmetry. Last year I focused on the search for the Higgs boson within the context of the Standard Model. DZero has a chance of observing this particle, thus making one of the most exciting discoveries in the history of particle physics, before the experiments at the LHC can collect sufficient data. I completed an analysis in one of the most sensitive channels, where the Higgs boson is produced along with a Z boson that decays to leptons. This year I was given the honor of leading the DZero Higgs group, and I hope we will be able to make some serious statements on Higgs bosons in the near future.

I've also had the opportunity to work on many projects that have improved the ability of DZero to take data and reconstruct it accurately. I played a major role in building DZero's Level 3 trigger and data acquisition system and in the calibration of the calorimeter. Through my work as convener of the bottom-quark jet identification group at DZero, I have been able to initiate and lead many interesting projects that have improved DZero's abilities.

The ATLAS experiment will study proton collisions using the nearly-completed LHC, which will provide seven times more energy than available at the Tevatron. With the Columbia group on ATLAS, I contributed to the manufacture, testing, installation, and commissioning of the sophisticated electronics which record data from the Liquid Argon calorimeter. I have also developed software for the monitoring of calorimeter data quality and am responsible for the display of calorimeter data in the ATLAS event display. And to prepare for physics from the ATLAS experiment, I have analyzed simulated data and optimized a search strategy for Higgs bosons in the decays of Supersymmetric particles. The entire physics community is extremely excited to see the results and almost certain discoveries from this new energy frontier, which opens as soon as 2008.

I look forward to remaining in an academic environment. I enjoy working with students, both

undergraduate and graduate. For the past three summers, I have been part of a REU program where I had the opportunity to advise undergraduates on projects related to high-energy physics. And I have enjoyed advising a graduate student in our group at Columbia for the past two years. I am excited to begin teaching undergraduate or graduate courses, which I feel will be an interesting and rewarding experience.

Thank you for considering me for this position. I feel I would be a good fit to your experimental high-energy group. Please feel free to contact me at [haas@fnal.gov](mailto:haas@fnal.gov) with any questions.

Sincerely,

Dr. Andrew C. Haas

P.S. - You may ask for letters of reference to be sent to you from the following contacts:

John Parsons <parsons@nevis.columbia.edu>

Jerry Blazey <Gerald.Blazey@science.doe.gov>

Gordon Watts <gwatts@fnal.gov>

## Curriculum Vitae

Andrew C. Haas

149 E. 61 St. - Apt. 4b, NY, NY 10065

Phone: 206-226-9340 email: haas@fnal.gov

### 1. Academic Degrees

PhD	University of Washington	2004	Physics
BS with Honors	Brown University	1998	Physics

### 2. Professional Experience

2004 - present      Postdoctoral Research Associate  
Department of Physics, Columbia University / Nevis Labs

Leading the DZero Higgs group since Fall 2007. Performed several analyses using data from Run II of the DZero experiment that address electro-weak symmetry breaking and the search for physics beyond the Standard Model. Published the most sensitive search for Higgs bosons in Supersymmetric models in 2005. Published a search for new long-lived particles in the context of split-Supersymmetry in 2007. Used an artificial neural-network to search for the Standard Model Higgs boson in the ZH dilepton channel, released in 2007. Convened the bottom-quark-jet identification group at DZero from 2005-2007. Calibrated DZero's hadronic calorimeter, leading to better reconstruction of jets. Continuing to support and improve the DZero DAQ system and event display.

Developed software for automated lifetime testing of the ATLAS LAr front-end boards (FEBs). Assisted with installation and commissioning of the FEBs on the ATLAS detector. Developed software for online data-quality monitoring of the FEBs. Performed a Higgs search in simulated ATLAS data using the ATHENA framework. Contributed to the ATLAS event display and outreach and have been responsible for calorimeter display since 2005.

1999 - 2004      Research Assistant  
Department of Physics, University of Washington, Seattle, WA

Performed a search using data from Run II of the DZero experiment at Fermilab to set a limit on the production of Higgs bosons in the MSSM, published 2005. Played major role in design, implementation, commissioning, and support of a new Level 3 trigger / data acquisition (DAQ) system for the DZero experiment based on commodity hardware and open-source software, leading to a publication in 2004. Implemented a monitoring system for the new data acquisition system at DZero, published in 2003. Developed software for the triggering and reconstruction of events from DZero, including a new algorithm for reconstructing charged particle tracks and event vertices, published in 2000.

1998 - 1999      Research Assistant / Teaching Assistant  
Department of Physics, University of Washington, Seattle, WA

Worked on simulations of the upcoming GLAST experiment. Worked on the DZero event display and debugged the detector geometry model. Taught laboratory classes in classical mechanics and E&M.

### 3. Other Experience and Activities

Summer 2003      SLAC Summer Institute  
Menlo Park, CA

Attended lectures and took part in discussion sessions focused on the interface between Cosmology and High-Energy Physics.

2002 - 2003      Graduate Student Representative  
Fermilab, Batavia, IL

Organized monthly talks, out-reach events, and a student conference. Took part in a trip to Washington, D.C. to raise awareness of High-Energy Physics in the Senate and Congress.

Summer 1999      Software Developer  
Pacific Northwest National Laboratories, Richland, WA

Developed software based on C++ and ROOT for the real-time monitoring of rare radioactive isotope concentrations.

### 4. Professional Affiliations

American Physical Society  
American Association for the Advancement of Science  
Elected member of Sigma Xi, The Scientific Research Society

### 5. Awards

2003      American Physical Society Northwest Section  
Best Student Talk

2002      DZero Collaboration Meeting  
Outstanding graduate-student contributions

## 6. Selected Publications

DZero Collaboration, "Search for stopped gluinos from p-anti-p collisions at  $s^{1/2} = 1.96\text{-TeV}$ ", Phys.Rev.Lett.99:131801,2007.

DZero Collaboration, "Search for neutral supersymmetric Higgs bosons in multijet events at  $s^{1/2} = 1.96\text{-TeV}$ ", Phys.Rev.Lett.95:151801,2005.

B.Angstadt, *et al.*, "The DZERO level 3 data acquisition system", IEEE Trans.Nucl.Sci.51:445-450, 2004.

A. Haas *et al.*, The DZero online monitoring and automatic DAQ recovery, FERMILAB-CONF-03-467, CHEP-2003-TUGP011, Jun 2003, physics/0306195.

A. Haas, "Simultaneous Tracking and Vertexing with Elastic Templates", Proceedings of the VII International Workshop on Advanced Computing and Analysis Techniques in Physics Research, Oct 2000.

## 7. Presentations, Papers, and Posters

A. Haas (2007), "Flavour Tagging: State of the Art", ALCPG, Fermilab, <http://ilc.fnal.gov/conf/alcpg07/>.

A. Haas for the DZero and CDF Collaborations (2007), "Searches for Non-SM Higgs at the Tevatron", Moriond QCD 2007.

A. Haas for the DZero Collaboration (2006), "Search for the SM Higgs boson in the  $ZH \rightarrow \mu\mu b\bar{b}$  channel", preliminary results for DPF 2006, <http://www-d0.fnal.gov/Run2Physics/WWW/results/prelim/HIGGS/H27/>.

A. Haas for the ATLAS Collaboration (2006), "MSSM Higgs Prospects at ATLAS", DPF, Hawaii.

A. Haas for the DZero Collaboration (2006), "New Phenomena Searches at DZero", Exploring New Phenomena Workshop, <http://home.fnal.gov/~gerstein/NPworkshop/>.

A. Haas for the DZero Collaboration (2006), "Evidence for  $Z \rightarrow b\bar{b}$  decays at DZero", preliminary results for ICHEP 2006, <http://www-d0.fnal.gov/Run2Physics/WWW/results/prelim/HIGGS/H22/>.

A. Haas for the DZero Collaboration (2005), "Search for non-SM Higgs at DZero", SUSY 2005, Durham, UK.

A. Haas for the DZero Collaboration (2004), "Higgs Searches at DZero", Lake

Louise, Alberta, CA.

A. Haas, “A search for neutral Higgs bosons at high  $\tan\beta$  in multi-jet events from  $p$  anti- $p$  collisions at  $s^{1/2} = 1960\text{-GeV}$ ”, FERMILAB-THESIS-2004-26.

A. Haas, *et al.* (2003), “Dataflow in the DZero Level3 Trigger / DAQ System”, Proceedings of the 2003 Nuclear Science Symposium, Section N36-71.

A. Haas for the DZero Collaboration (2003), “Recent Results from DZero”, American Physics Society Northwest Session, Portland, OR.

A. Haas for the DZero Collaboration (2003), “Search for Neutral Supersymmetric Higgs Bosons at the  $D\bar{O}$  Detector at the Tevatron in Run II”, American Physical Society April Meeting, Philadelphia, PA.

A. Haas, *et al.* (2002), “Ethernet-based Data Acquisition for the DZero Experiment at Fermilab”, Proceedings of the 2002 World Multi-Conference on Systematics, Cybernetics, and Informatics.

A. Haas for the DZero Collaboration (2002), “Search for Neutral Supersymmetric Higgs Bosons at the  $D\bar{O}$  Detector at the Tevatron in Run II”, American Physical Society April Meeting, Albuquerque, NM.

A. Haas (1998), “The Search for the Stau at DZero”, Senior Thesis, Brown University.