Andrew C. Haas
October 21, 2007

Prof. Robert Wald, Chair
Department of Physics
University of Chicago
5720 S. Ellis Ave.
Chicago, IL 60637
(Ms. Pat Plitt <p-plitt@uchicago.edu>)

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 with any questions.

Sincerely,

Dr. Andrew C. Haas

I have asked for letters of reference to be sent to you from the following contacts:

John Parsons <parsons@nevis.columbia.edu>
Jerry Blazey <blazey@fnal.gov>
Matt Strassler <strassler@physics.rutgers.edu>

PS – I deeply apologize this application is being sent past the Nov. 1 deadline, and I hope I can still be fully considered for the position.

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 di-lepton 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-TeV”, Phys.Rev.Lett.99:131801,2007.

DZero Collaboration, “Search for neutral supersymmetric Higgs bosons in multijet events at s**(1/2) = 1.96-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->mumubb 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->bb 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-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 DØ 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 DØ 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.

Statement of Research Interests

Dr. Andrew C. Haas

The near-term future of experimental high-energy physics is without doubt at the LHC, and I would focus my research on the ATLAS experiment. With high-energy data likely in late 2008, extremely exciting times are right around the corner. As a post-doc with the Columbia ATLAS group, I've already had a chance to contribute to commissioning efforts of the calorimeter and become familiar with the data analysis infrastructure by doing a simulated analysis. I would continue to help with the commissioning of the detector and software, as well as becoming even more involved in plans for triggering and physics analyses. My goal would be to make sure that myself, and the rest of the group, including students and post-docs, are ready to analyze and understand the first data from ATLAS, in search of new discoveries. Hopefully what I am interested in at ATLAS will be greatly influenced by discoveries in the initial ATLAS data! Otherwise I would likely continue to search for new phenomena such as Supersymmetry, or other more exotic signatures of new physics.

I am also very interested in the prospect of a future International Linear Collider (ILC), and would like to take part in the planning and building of an experiment there. I have greatly enjoyed contributing to the commissioning of the DZero and ATLAS experiments. I think it would be even more rewarding to have a greater impact on the planning of an ILC experiment, by getting involved early in the design phase. I have gained significant experience in calorimetry, tracking / b-jets, and data acquisition and think I could contribute significantly to a detector design. I would also like to work for the possibility of building the ILC here in the United States, possibly at Fermilab, since it seems crucial for sustaining American high-energy experimental physics in the long-term.