Andrew C. Haas
November 15, 2007

High Energy Experimental Committee Chair
Department of Physics, University of California
Davis, CA 95616
(heesearch@physics.ucdavis.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