

Jonathan Efron

Address:

Ohio State
MS 318
Fermi National Accelerator Laboratory
PO Box 500
Batavia, IL 60510
Phone: (630) 840-8434
Email: efron@mps.ohio-state.edu

EDUCATION

The Ohio State University, Columbus

Ph.D. in Physics **est. 2007**

M.S. in Physics **2005**

Dissertation: "Search for the Standard Model Higgs Boson in the $ZH \rightarrow \ell^+ \ell^- b \bar{b}$ Channel at CDF Run II"

Advisors: Prof. Brian Winer and Prof. Richard Hughes

University of Michigan, Ann Arbor

B.S. High Honors in Physics **2001**

Minor: Mathematics

AWARDS

- Fowler Fellowship, *The Ohio State University, Columbus* **2002 – 2005**
 - Sigma Pi Sigma Physics Honor Society, *University of Michigan, Ann Arbor* **1999 – 2001**
 - Issac Newton Award in Physics, *Highland Park High School, IL* **1997**
-

RESEARCH EXPERIENCE

The Ohio State University, Columbus

Research Assistant **2005 – present**

Fowler Fellow **2002 – 2005**

Thesis Project: I searched for the Standard Model Higgs in $ZH \rightarrow \ell^+ \ell^- b \bar{b}$ channel for my thesis analysis. Despite using a channel with a smaller cross-section and branching ratio, this analysis set a 95% confidence level upper limit that is competitive with other Tevatron low mass SM Higgs Boson searches. These are some of the contributions I made during the course of this analysis: Pioneered the use of Neural Networks to search for Higgs events at the Tevatron Run II. Created a neural network optimization algorithm to get best selection criteria to separate signal to background. Helped other analyses implement neural networks. Started the CDF Run II $ZH \rightarrow \ell^+ \ell^- b \bar{b}$ analysis and was a primary investigator. Developed event selection criteria, including widening lepton acceptance. Implemented a jet fitter that improved the dijet mass resolution of Higgs events. Wrote C++ code event selection code that categorizes signal and control regions, while calculating and plotting event kinematics. Wrote scripts in Linux environment to gather separate data and MC samples to create tables and histograms. Created public website in HTML to publicize result. Contributor and beta tester for code that estimates non-b or c quark events in our b quark selection. Developed new method to deal with these events' kinematic distributions.

Hardware Project: I participated in an upgrade of the CDF trigger tracking system (XFT). As the Tevatron reached higher instantaneous luminosities, the fake rate of high P_T tracks in the XFT was expected to grow exponentially and cause lost data because of trigger deadtime. In order to reduce the fake rate, new trigger electronics were added to the XFT system that provided a 3D stereo confirmation of tracks. I commissioned OSU's contribution to the upgrade. My responsibilities included: Ensured data acquisition and transmission quality of the new electronics developed by OSU.

Synchronized the new electronic boards with the CDF data acquisition system. Wrote code that followed and compared data words as they were transmitted through the XFT system to ensure consistency. Diagnosed problems that first occurred within the CDF detector trigger system and not in people's personal test environments. Wrote code in C and Java that initialized the new electronic boards. On call expert of the XFT system.

Other Projects: Served as a Run II data acquisition expert from December 2004 to February 2005. ("ACE") Prepared CDF detector for data taking. Monitored detector operation during data taking. Solved data acquisition problems as quickly as possible to minimize downtime when colliding beams were present. Performed detector calibrations between data taking periods.

Analyzed track finding efficiency of CDF central tracking gas drift chamber. Measured the discrepancy of the results in CDF data and the expected efficiency in monte carlo simulations. Calculated systematic errors that arose in this measurement.

University of Michigan, Ann Arbor

1999 – 2001

CDF Undergraduate Research

Wrote commissioning tests and programming scripts for the XTC cards and TDC boards. Analyzed inclusive jet cross-section for honors thesis. Commissioned XTC cards for CDF Run II. Repaired broken TDC boards.

MISCELLANEOUS EXPERIENCE

The Ohio State University, Columbus

Teaching Assistant

2003 – 2004

Led Discussion Section for Intro to Physics Lecture. Reviewed assignments in class. Provided office hours extra help. Graded exams.

City Year, Detroit, MI

Corps Member

2001 – 2002

Community Service Americorps program. Primary role was tutoring and leading after school programs at Henry Ford Academy, Dearborn, MI. Other various community service programs.

PUBLICATIONS AND PAPERS

- On CDF collaboration author list since Jan 2005
Co-author of 54 published articles. Full List: <http://www-cdf.fnal.gov/~efron/CV.pdf>
- "The CDF II eXtremely Fast Tracker Upgrade."
Nucl.Instrum.Meth.A572: 358-360 2007
- Physical Review Letters and Physics Review D articles are being prepared for thesis topic

TALKS

- "Prospects of a $ZH \rightarrow \ell^+ \ell^- b\bar{b}$ Search at CDF" APS April 2005
- "Search for the Standard Model Higgs Boson in the $ZH \rightarrow \ell^+ \ell^- b\bar{b}$ Channel at CDF" DPF October 2006

REFERENCES

Prof. Brian Winer	Prof. Richard Hughes	Dr. Peter Wilson	Prof. Beate Heinemann
Department of Physics	Department of Physics	FNAL MS318	UC Berkeley
The Ohio State University	The Ohio State University	Fermi National Accelerator Laboratory	Lawrence Berkeley National Laboratory
191 W. Woodruff Ave.	191 W. Woodruff Ave.	PO Box 500	1 Cyclotron Rd Mailstop: 50B-6241
Columbus, OH 43210	Columbus, OH 43210	Batavia, IL 60510	Berkeley, CA 94720
(614) 292-8996	(614) 292-3885	(630) 840-2156	+41764872761
winer@mps.ohio-state.edu	hughes@mps.ohio-state.edu	pjw@fnal.gov	BHEHeinemann@lbl.gov