

RAYMOND EDWARD HALL

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Education

University of California, Riverside, Ph.D. Physics, 1994

Thesis title: *Search for the Top Quark in Dimuon Events at $D\bar{0}$*

University of California, Riverside, M.S. Physics, 1990

California State University, Fresno, B.S. (Hons) Physics, Minors in Math and Chemistry, 1988

Work Experience

2010 – Present

Professor

Department of Physics, California State University, Fresno.

2004 – 2010

Associate Professor

Department of Physics, California State University, Fresno.

1999 – 2004

Assistant Professor

Department of Physics, California State University, Fresno.

1989 – 2010

Member of the DZero Detector Collaboration

Fermi National Accelerator Laboratory, Batavia, Illinois

1997 – 1999

Assistant Researcher and Lecturer

Department of Physics and Astronomy, University of California, Irvine

Teaching Experience

I am an instructor for undergraduate and graduate courses in physics and astronomy, as well as a general education course in critical thinking and the philosophy of science. My primary teaching in physics is first year calculus based physics for scientists and engineers, and upper division undergraduate Quantum Mechanics. In 2001, I began teaching a section of my critical thinking course for the Smittcamp Honors College which I continue to offer every fall semester. I also team teach an upper division general education course for the Honors College, H102: Revolutions in Science and Social Science, in which I cover the major themes in philosophy of science within the context of major revolutions in worldview since the time of Galileo. I also teach First Year Experience courses to incoming freshman cohorts. In addition, I serve as the coordinator of outcomes assessment for our BS program.

Research Experience: Fermi National Accelerator Laboratory

The majority of my published research involved the DØ Collaboration (a 700+ member experimental particle physics experiment at Fermilab) which took place from June 1989 to 2010. The following paragraphs discuss a few highlights of my participation.

Discovery of the Top Quark

I developed the analysis for the top quark search via the decay mode $\bar{t}t \rightarrow \mu\mu + X$ (dimuon channel) for the DØ collider detector at Fermi National Laboratory. This analysis combined with those from DØ top searches in other channels demonstrated a 4.7 sigma signal for top pair production in 1995.

The DØ Silicon Microstrip Tracker Beam Tests

In the summer of 1997 I was run coordinator for a series of beam tests which studied components of the Silicon Microstrip Tracker (SMT) for the DØ Upgrade. I designed the agenda for the run, organized the shift work, supervised the training of 32 shift workers, and handled scheduling of beam with the accelerator division. The beam test studied the impact parameter resolution of the SMT and its ability to tag b -quarks through displaced decay vertices and studied the performance of the final version of the SVXIIe readout system for the first time.

Run IIb Silicon Detector Production and Testing

CSU Fresno and six other institutions applied for a National Science Foundation instrumentation grant to design and build a replacement termed the Run IIb Silicon Detector. Our grant was awarded in June of 2001 with funding totaling \$2.6 million. CSU Fresno's responsibility of design, fabrication and testing of the front end readout electronics was funded with \$142,573.00 of the above amount. Undergraduate research assistants participated in the production testing of the SVX4 readout hybrids and I oversaw production of these BeO circuit cards and their assembly. This upgrade was implemented in 2006.

Selected Publications

As a member of the DØ Collaboration, my name appears on every publication along with my 350+ collaborating coauthors. I share authorship on 378 published papers to date. The following selection of papers are those that feature my work prominently. My complete publication list is available upon request.

The DØ Silicon Microstrip Tracker.

The DØ Collaboration (S.N. Ahmed et al.) Nucl.Instrum.Meth.A634:8-46, 2011

Measurement of the t-channel single top quark production cross section.

The DØ Collaboration (V.M. Abazov *et al.*). Phys.Lett.B682:363-369, 2010.

Observation of Single Top Quark Production (Cited: 250+)

The DØ Collaboration (V.M. Abazov *et al.*). Phys.Rev.Lett. 103 (2009) 092001

Measurement of B_s^0 mixing parameters from the flavor-tagged decay $B_s^0 \rightarrow J/\psi\phi$ (Cited: 300+)

The DØ Collaboration (V.M. Abazov *et al.*) Phys.Rev.Lett. 101 (2008) 241801

The Upgraded D0 detector (Cited: 900+)
The DØ Collaboration (V.M. Abazov *et al.*) Nucl.Instrum.Meth. A565 (2006) 463-537

A precision measurement of the mass of the top quark (Cited: 300+)
The DØ Collaboration (V.M. Abazov *et al.*) Nature 429 (2004) 638-642

Direct measurement of the top quark mass at DØ (Cited: 250+)
The DØ Collaboration (B. Abbott *et al.*) Phys.Rev. D58 (1998) 052001

Observation of the top quark (Cited: 2000+)
The DØ Collaboration (S. Abachi *et al.*). Phys.Rev.Lett. 74 (1995) 2632-2637

Public Education and Outreach Activities

I have presented talks on critical thinking and modern physics pedagogy at seven of the Annual California Science Teachers Association meetings since 1999. I am also an organizer of the annual meeting of the James Randi Educational Foundation since 2004, and I chair the academic scholarship committee for that organization. The following list of presentations is a selection of the some of my recent activity concerning the promotion of critical thinking and science education.

Conference Organizer and Director of Programming.
12th Annual Amazing Meeting of the James Randi Educational Foundation.
July 17-20, 2014, Las Vegas, NV

Invited Conference Organizer and Chair of Scientific Papers.
11th Annual Amazing Meeting of the James Randi Educational Foundation.
July 14-17, 2014, Las Vegas, NV

An Introduction to the Philosophy of Science: How We Know What Is and Isn't So.
An Osher Institute Short Course
April 9, 16, 23, and 30, 2:30-4pm
Alice Peters Auditorium, California State University, Fresno

Quantum Mechanics and the Meaning of the Uncertainty Principle
Central Valley Café Scientifique in collaboration with The New Ensemble's performance of Michael Frayn's Copenhagen
November 7, 2011
The Landmark Restaurant, Olive Ave, Fresno CA

Demarcation: Is there a Sharp Line between Science and Pseudoscience?
Central Valley Cafe Scientifique
April 5, 2010, Fresno, CA

Critical Thinking in Government
Two day seminar series on critical thinking for
K2B International (conference and training course corporation)
July 30-31, 2009, Singapore