

CURRICULUM VITAE

Eric D. Zimmerman

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Education:

Ph.D. in physics, The University of Chicago, 1998
Thesis: *Measurement of the Branching Ratio of $\pi^0 \rightarrow e^+e^-$ Using $K_L \rightarrow 3\pi^0$ Decays in Flight*
Advisor: Y. W. Wah

S.B. in physics, Massachusetts Institute of Technology, 1993
Thesis: *Measurement of the Correlation Spectrum of Electrostatic Potential Fluctuations in a Toroidal Helimak Plasma*
Advisor: S. C. Luckhardt

Academic positions:

Assistant Professor, Department of Physics, The University of Colorado at Boulder, August 2001 to present.

Associate Research Scientist, Columbia University Nevis Laboratories, July 2000 to August 2001, on Fermilab experiments E815 (NuTeV) and E898 (BooNE).

Postdoctoral Research Associate, Columbia University Nevis Laboratories, December 1998 to June 2000, on Fermilab experiments E815 (NuTeV) and E898 (BooNE).

Research Assistant, Enrico Fermi Institute, The University of Chicago, 1993-1998, on Fermilab experiments E799 and E832 (KTeV).

Teaching assistant, Department of Physics, The University of Chicago, 1993-1994. Taught laboratory and recitation sections in introductory physics.

Undergraduate research, MIT Plasma Fusion Center, 1990-1993.

Grader, Departments of Physics and Electrical Engineering, Massachusetts Institute of Technology, 1991-1993.

Fellowships:

US Dept. of Education GAANN fellowship, 1993-1994.

Postdocs:

- Martin Tzanov (Postdoc 2005-, Ph.D. Univ. of Pittsburgh 2005)
- Terrence L. Hart (Postdoc 2002-2005, Ph.D. Ohio State University, 2001)
Present address: Illinois Institute of Technology, Chicago, Ill.

Graduate Students:

- Patrick Toale, Ph.D. 2004. Present address: Penn State University, University Park, Pa.
- Rune Niclasen, M.S. Univ. of Copenhagen 2000, Ph.D. expected 2006
- Robert Nelson, B.S. UC-Santa Barbara 2003, Ph.D. expected 2008
- Michael Wilking, B.S. Univ. of Minnesota 2001, Ph.D. expected 2008

RECENT TALKS AND SEMINARS

Eric D. Zimmerman

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1. Santa Fe, N. M.: Particles and Nuclei International Conference (PANIC) 2005, invited parallel talk, October 2005
2. Fermilab, Ill.: Fifth International Workshop on Neutrino Beams and Instrumentation, one invited talk, July 2005
3. Uppsala, Sweden: Lepton-Photon 2005, invited plenary talk, July 2005
4. Colorado State University: Physics Colloquium, December 2004
5. University of Colorado: Physics Colloquium, October 2004
6. KEK, Tsukuba, Japan: NP04 workshop, September 2004
7. University of Illinois: High Energy Physics seminar, November 2003
8. Osaka University, Japan: High Energy Physics seminar, November 2003
9. KEK, Tsukuba, Japan: Fourth International Workshop on Neutrino Beams and Instrumentation, two invited talks, November 2003
10. KEK, Tsukuba, Japan: Physics Seminar, February 2003
11. Kanazawa, Japan: 3rd Conference on Neutrino Oscillations and their Origin (NOON2003), Invited talk, February 2003
12. Santa Cruz, Calif.: 7th International Workshop on Tau Lepton Physics (Tau02), Invited talk, September 2002
13. SLAC, Calif.: SLAC Experimental Physics Seminar, March 2002
14. CERN, Switzerland: Third International workshop on Neutrino Beams and Instrumentation, two talks (one invited, one contributed), March 2002
15. University of Illinois: High Energy Physics Seminar, April 2001
16. UC-Santa Barbara: Physics Colloquium and High Energy Physics Seminar, March 2001
17. Brown University: Particle/Astroparticle Physics Seminar, March 2001

18. University of Colorado: Physics Colloquium, February 2001
19. SUNY-Stony Brook: High Energy Physics Seminar, February 2001
20. California Institute of Technology: High Energy Physics seminar, January 2001
21. University of Chicago: High Energy Physics seminar, November 2000
22. Buffalo, NY: APS New York Symposium: Invited plenary talk, October 2000
23. New York University: Physics Colloquium, September 2000
24. University of Cincinnati: High Energy Physics seminar, September 2000
25. SLAC, Calif.: SLAC Summer Institute 2000: Invited plenary talk, August 2000
26. Québec City: Conference on the Intersections of Nuclear and Particle Physics (CIPANP 2000): Invited talk, parallel session, May 2000
27. University of Virginia: Physics Colloquium, March 2000
28. Fermilab: Neutrino Factory Physics Study talk, Fermilab, February 2000
29. University of Chicago: High Energy Physics lunch seminar, January 2000
30. Fermilab: Joint Experimental Theoretical Physics (“Wine and Cheese” seminar), December 1999
31. Harvard University: High Energy Physics seminar, October 1999
32. DESY, Germany: DESY Theory Workshop parallel talk, September 1999
33. University of Chicago: High Energy Physics seminar, October 1998
34. Fermilab: Heavy Quarks at Fixed Target conference (HQ98): Plenary talk, October 1998
35. Columbia University: Nuclear/Particle Physics seminar, September 1998
36. Cornell University: High Energy Physics (Journal Club) seminar, September 1998
37. Lawrence Berkeley Lab: High Energy Physics seminar, September 1998
38. Los Alamos National Laboratory: High Energy Physics seminar, August 1998

LIST OF PUBLICATIONS¹

Eric D. Zimmerman

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1. M. Tzanov *et al.*, “Precise Measurement of Neutrino and Anti-Neutrino Differential Cross-Sections,” e-print hep-ex/0509010. Submitted to *Phys. Rev. D*.
2. E. D. Zimmerman, “Neutrino Physics at Short Baselines,” to be published in the Proceedings of Lepton-Photon 2005, Uppsala, Sweden.
3. E. Abouzaid *et al.*, “A Measurement of the K^0 Charge Radius and a CP Violating Asymmetry together with a Search for CP Violating E1 Direct Photon Emission in the Rare Decay $K_L^0 \rightarrow \pi^+\pi^-e^+e^-$.” e-print hep-ex/0508010. Submitted to *Phys. Rev. Lett.*
4. T. Alexopoulos *et al.*, “Measurements of the Branching Fractions and Decay Distributions for $K_L^0 \rightarrow \pi^+\mu^-\nu\gamma$ and $K_L^0 \rightarrow \pi^+e^-\nu\gamma$,” *Phys. Rev.* **D71** 012001 (2005).
5. T. Alexopoulos *et al.*, “Measurements of Semileptonic K_L^0 Decay Form Factors,” *Phys. Rev.* **D70** 092007 (2004).
6. T. Alexopoulos *et al.*, “Measurements of K_L^0 Branching Fractions and the CP violation parameter $|\eta_{+-}|$,” *Phys. Rev.* **D70** 092006 (2004).
7. E. D. Zimmerman, “BooNE at Six Months,” Workshop on Neutrino Oscillations and their Origin (NOON 2003), Kanazawa, Japan. World Scientific (2004).
8. T. Alexopoulos *et al.*, “A Determination of the CKM Parameter $|V_{us}|$,” *Phys. Rev. Lett.* **92** 181802 (2004).
9. K. S. McFarland *et al.*, “Nuclear Effects and the NuTeV $\sin^2(\theta_W)$ Measurement,” *Nucl. Phys. Proc. Suppl.* **112** 226 (2002).
10. A. Alavi-Harati *et al.*, “Search for the $K_L \rightarrow \pi^0\pi^0e^+e^-$ Decay in the KTeV Experiment,” *Phys. Rev. Lett.* **89** 211801 (2002).
11. E. D. Zimmerman, “BooNE has Begun,” 7th International Workshop on Tau Lepton Physics (Tau02), Santa Cruz, Calif., 10-13 Sept., 2002. **eConf C0209101:TH05,2002** (2002).
12. A. Alavi-Harati *et al.*, “Measurements of Direct CP Violation, CPT Symmetry, and other Parameters in the Neutral Kaon System,” *Phys. Rev.* **D67** 102005 (2003).

¹Conference proceedings are listed only for talks given by EDZ.

13. G. P. Zeller *et al.*, “Reply to the Comment on ‘A Precise Determination of Electroweak Parameters in Neutrino Nucleon Scattering,’ ” e-print hep-ex/0207052 (2002), Submitted to *Phys. Rev. Lett.*
14. G. P. Zeller *et al.*, “On the Effect of Asymmetric Strange Seas and Isospin Violating Parton Distribution Functions on $\sin^2 \theta_W$ Measured in the NuTeV Experiment,” *Phys. Rev.* **D65** 111103 (2002).
15. A. Alavi-Harati *et al.*, “A Measurement of the K_L Charge Asymmetry,” *Phys. Rev. Lett.* **88** 181601 (2002).
16. S. Avvakumov *et al.*, “A Search for $\nu_\mu \rightarrow \nu_e$ and $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ Oscillations at NuTeV,” *Phys. Rev. Lett.* **89** 011804 (2002).
17. G. P. Zeller *et al.*, “A Precise Determination of Electroweak Parameters in Neutrino Nucleon Scattering,” *Phys. Rev. Lett.* **88** 091802 (2002).
18. A. Alavi-Harati *et al.*, “Radiative Decay Width Measurements of Neutral Kaon Excitations using the Primakoff Effect,” *Phys. Rev. Lett.* **89** 072001 (2002).
19. M. Artuso *et al.*, “Flavor Physics: The Flavor Physics (P2) Working Group,” FERMILAB-CONF-01-428, SNOWMASS-2001-P2001, *Proceedings of the APS / DPF / DPB Summer Study on the Future of Particle Physics (Snowmass 2001)*, Snowmass, Colorado, 2001.
20. A. Alavi-Harati *et al.*, “Branching Ratio Measurement of the Decay $K_L \rightarrow e^+e^-\mu^+\mu^-$,” *Phys. Rev. Lett.* **87** 111802 (2001).
21. B. T. Fleming *et al.*, “Results of the Survey on the Future of HEP,” e-print hep-ex/0108040.
22. A. Alavi-Harati *et al.*, “A New Measurement of the Radiative K_{e3} Branching Ratio and Photon Spectrum,” *Phys. Rev.* **D64** 112004 (2001).
23. A. Alavi-Harati *et al.*, “First Measurement of Form Factors of the Decay $\Xi^0 \rightarrow \Sigma^+e^-\bar{\nu}_e$,” *Phys. Rev. Lett.* **87** 132001 (2001).
24. A. Alavi-Harati *et al.*, “Measurement of the Branching Ratio and Form Factor of $K_L^0 \rightarrow \mu^+\mu^-\gamma$ ” *Phys. Rev. Lett.* **87** 071801 (2001).
25. A. Alavi-Harati *et al.*, “Measurements of the Rare Decay $K_L \rightarrow e^+e^-e^+e^-$,” *Phys. Rev. Lett.* **86** 5425 (2001).
26. U.-K. Yang *et al.*, “Extraction of $R = \sigma_L/\sigma_T$ from CCFR Fe- ν_μ and Fe- $\bar{\nu}_\mu$ Differential Cross-Sections,” *Phys. Rev. Lett.* **87** 251802 (2001).

27. T. Adams *et al.*, “Observation of an Anomalous Number of Dimuon Events in a High Energy Neutrino Beam,” *Phys. Rev. Lett.* **87** 041801 (2001).
28. J. A. Formaggio *et al.*, “Search for the Lepton Number Violating Process $\bar{\nu}_\mu e \rightarrow \mu^- \bar{\nu}_e$,” *Phys. Rev. Lett.* **87** 071803 (2001).
29. M. Goncharov *et al.*, “Precise Measurement of Dimuon Production Cross-sections in ν_μ -Fe and $\bar{\nu}_\mu$ -Fe Deep Inelastic Scattering at the Tevatron,” *Phys. Rev.* **D64** 112006 (2001).
30. B. T. Fleming *et al.*, “A First Measurement of Low- x , Low- Q^2 Structure Functions in Neutrino Scattering,” *Phys. Rev. Lett.* **86** 5430 (2001).
31. A. Alavi-Harati *et al.*, “First Observation of the Decay $K_L \rightarrow \pi^0 e^+ e^- \gamma$,” *Phys. Rev. Lett.* **87** 021801 (2001).
32. A. Alavi-Harati *et al.*, “Search for the Decay $K_L^0 \rightarrow \pi^0 e^+ e^-$,” *Phys. Rev. Lett.* **86** 397 (2001)
33. U.-K. Yang *et al.*, “Measurements of F_2 and xF_3^ν from CCFR ν_μ -Fe and $\bar{\nu}_\mu$ -Fe Data in a Physics Model Independent Way,” *Phys. Rev. Lett.* **86** 2742 (2001).
34. E. D. Zimmerman, “Recent Results Addressing the KARMEN Timing Anomaly,” *AIP conference proceedings No. 549: 7th Conference on Intersections of Particle and Nuclear Physics*, Quebec City (2000)
35. A. Alton *et al.*, “Observation of Neutral Current Charm Production in ν_μ -Fe Scattering at the Tevatron,” *Phys. Rev.* **D64** 012002 (2001).
36. A. Alavi-Harati *et al.*, “Study of the $K_L^0 \rightarrow \pi^+ \pi^- \gamma$ Direct Emission Vertex,” *Phys. Rev. Lett.* **86** 761 (2001)
37. A. Alton *et al.*, “Search for Light to Heavy Quark Flavor Changing Neutral Currents in ν_μ -N and $\bar{\nu}_\mu$ -N Scattering at the Tevatron,” *Phys. Rev.* **D63** 012001 (2001)
38. A. Alavi-Harati *et al.*, “Search for the decay $K_L \rightarrow \pi^0 \mu^+ \mu^-$,” *Phys. Rev. Lett.* **84** 5279 (2000)
39. J. Formaggio *et al.*, “Search for a 33.9 MeV/ c^2 Neutral Particle in Pion Decay,” *Phys. Rev. Lett.* **84** 4043 (2000)
40. C. Albright *et al.*, “Physics at a Neutrino Factory,” FERMILAB-FN-692 (2000)
41. A. Alavi-Harati *et al.*, “Observation of the decay $K_L \rightarrow \mu^+ \mu^- \gamma \gamma$,” *Phys. Rev.* **D62** 112001 (2000)
42. A. Alavi-Harati *et al.*, “Search for the Weak Decay of a Lightly Bound H^0 Dibaryon,” *Phys. Rev. Lett.* **84** 2593 (2000)

43. A. Alavi-Harati *et al.*, “Search for the Decay $K_L \rightarrow \pi^0 \nu \bar{\nu}$ using $\pi^0 \rightarrow e^+ e^- \gamma$,” *Phys. Rev.* **D61** 072006 (2000)
44. T. Adams *et al.*, “Evidence for Diffractive Charm Production in ν_μ -Fe and $\bar{\nu}$ -Fe Scattering at the Tevatron,” *Phys. Rev.* **D61** 092001 (2000)
45. A. Alavi-Harati *et al.*, “Observation of CP Violation in $K_L \rightarrow \pi^+ \pi^- e^+ e^-$ Decays,” *Phys. Rev. Lett.* **84** 408 (2000)
46. A. Vaitaitis *et al.*, “Search for Neutral Heavy Leptons in a High Energy Neutrino Beam,” *Phys. Rev. Lett.* **83** 4943 (1999)
47. A. Alavi-Harati *et al.*, “Light Gluino Search for Decays Containing $\pi^+ \pi^-$ or π^0 from a Neutral Hadron Beam at Fermilab” *Phys. Rev. Lett.* **83** 2128 (1999)
48. A. Alavi-Harati *et al.*, “Measurement of the Branching Ratio of $\pi^0 \rightarrow e^+ e^-$ Using $K_L \rightarrow 3\pi^0$ Decays in Flight” *Phys. Rev. Lett.* **83** 922 (1999)
49. A. Alavi-Harati *et al.*, “Measurement of the Decay $K_L \rightarrow \pi^0 \gamma \gamma$ ” *Phys. Rev. Lett.* **83** 917 (1999)
50. A. Alavi-Harati *et al.*, “Observation of Direct CP Violation in $K_{S,L} \rightarrow \pi \pi$ Decays” *Phys. Rev. Lett.* **83** 22 (1999)
51. A. Affolder *et al.*, “Observation of the Decay $\Xi^0 \rightarrow \Sigma^+ e^- \bar{\nu}_e$ ” *Phys. Rev. Lett.* **82** 3751 (1999)
52. J. Adams *et al.*, “Search for the Decay $K_L \rightarrow \pi^0 \nu \bar{\nu}$ ” *Phys. Lett.* **B447** 240 (1999)
53. E. D. Zimmerman, “Use of the $K_L \rightarrow 3\pi^0$ Decay as a Tagged Photon Source to Measure Material Thickness in a Neutral Kaon Beam” *Nucl. Inst. and Meth.* A426 229 (1999)
54. R. Ford *et al.*, “A Low Cost, 400 Gauss 18 inch Gap C-Magnet Using Permanent Magnet Technology,” *Nucl. Inst. and Meth.* **A426** 238 (1999)
55. E. D. Zimmerman, “Measurement of the Branching Ratio of $\pi^0 \rightarrow e^+ e^-$ using $K_L \rightarrow 3\pi^0$ Decays in Flight” PhD Thesis, The University of Chicago (1998)
56. E. D. Zimmerman, “Rare Decays of the K_L and π^0 : New Results from E799-II and E832” *AIP conference proceedings No. 459: Workshop on Heavy Quarks at Fixed Target (HQ98)*, Batavia, Illinois (1998)
57. J. Adams *et al.*, “Measurement of the Branching Fraction of the Decay $K_L \rightarrow \pi^+ \pi^- e^+ e^-$,” *Phys. Rev. Lett.* **80** 4123 (1998)
58. J. Adams *et al.*, “Search for Light Gluinos via the Spontaneous Appearance of $\pi^+ \pi^-$ pairs with an 800 GeV/c Proton Beam at Fermilab,” *Phys. Rev. Lett.* **79** 4083 (1997)

59. G. E. Graham *et al.*, "Design and Test Results of a Transition Radiation Detector for a Fermilab Fixed Target Rare Kaon Decay Experiment," *Nucl. Inst. and Meth.* **A367** 224 (1995)
60. E. D. Zimmerman and S. C. Luckhardt, "Measurement of the Correlation Spectrum of Electrostatic Potential Fluctuations in an ECRH Helimak Plasma," *J. Fusion Energy* **12** 289 (1993)
61. E. D. Zimmerman *et al.*, "Measurement of the Correlation Spectrum of Electrostatic Potential Fluctuations in a toroidal ECRH Plasma," AIP Conference Proceedings No. 289: Tenth Topical Conference on RF Power in Plasmas, Boston, Mass., 1993