VITAE – STEPHEN A. WOLBERS

February 20, 2002

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| Birth Date: | June 27, 1955, Sheldon, IA. |
| Present Position: | Scientist II<br>Fermilab MS 370<br>Computing Division<br>P.O. Box 500<br>Batavia, IL 60510 |

EDUCATION

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|---|---|
| Undergraduate: | A.B. Degree, 1978, U.C. Berkeley (Math and Physics) |
| Graduate: | M.A. Degree, 1980, U.C. Berkeley (Physics) |
| | Ph.D. Degree, December, 1984, U.C. Berkeley (Physics) |
| Ph.D. Advisor: | Harry H. Bingham (deceased) |
| Thesis Title: | Inclusive Photoproduction of Strange Baryons at 20 GeV. |

POSITIONS HELD

**Scientific Appointments:**

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|---|---|
| September, 1978 – June, 1980 | Teaching Assistant, U.C. Berkeley |
| June, 1980 – December, 1984 | Research Assistant, U.C. Berkeley |
| January, 1985 – July, 1989 | Research Associate, Fermilab |
| July, 1989 – October, 1994 | Associate Scientist, Fermilab |
| October, 1994 – May 1, 1998 | Scientist I, Fermilab |
| May 1, 1998 – present | Scientist II, Fermilab |

**Management Appointments:**

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|---|---|
| April, 1991 – February, 1994 | Group Leader, Farms Group, Computing Division |
| February, 1994 – December 31, 1996 | Head, OSS Department<br>Computing Division, Fermilab |
| January 1, 1997 – June 30, 1998 | Deputy Head, Computing Division, Fermilab |
| July 1, 1998 – September 30, 1998 | Acting Head, Computing Division, Fermilab |
| October 1, 1998 – present | Deputy Head, Computing Division, Fermilab |

## EXPERIMENTAL AFFILIATION

| | |
|---|---|
| 1980 – 1984 | SLAC Expt BC 72/73/75/76 |
| 1985 – Present | Fermilab Expt E665 |
| 1997 – Present | Fermilab Expt CDF |

Member, APS and ACM.

Home Page: home.fnal.gov/~wolbers

Stephen Wolbers
Publication List

**CDF**

1. T. Affolder, *et al.,* SEARCH FOR THE FLAVOR CHANGING NEUTRAL CURRENT DECAYS $B^+ \to \mu^+\mu^- K^+$ AND $B^0 \to \mu^+\mu^- K^{*0}$. FERMILAB-PUB-99-138-E, May 1999. Phys.Rev.Lett. 83:3378-3383,1999

2. T. Affolder, *et al.,* SEARCH FOR TECHNICOLOR PARTICLES IN LEPTON PLUS TWO JETS AND MULTIJET CHANNELS IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-141-E, May 1999. 10pp. Submitted to Phys.Rev.Lett.

3. T. Affolder, *et al.,* MEASUREMENT OF THE $B^0\overline{B^0}$ OSCILLATION FREQUENCY USING $l^- D^{*+}$ PAIRS AND LEPTON FLAVOR TAGS. FERMILAB-PUB-99-210-E, Jul 1999. Phys.Rev.D60:112004,(1999)

4. T. Affolder, *et al.,* OBSERVATION OF DIFFRACTIVE BEAUTY PRODUCTION AT THE FERMILAB TEVATRON. FERMILAB-PUB-99-229-E, Aug 99. Phys.Rev.Lett.84:232-237,(2000)

5. T. Affolder, *et al.,* THE TRANSVERSE MOMENTUM AND TOTAL CROSS SECTION OF $e^+e^-$ PAIRS IN THE Z-BOSON REGION FROM $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-220-E, Phys.Rev.Lett.84:845-850,(2000)

6. T. Affolder, *et al.,* A MEASUREMENT OF $\sin(2\beta)$ FROM $B \to J/\psi K_s^0$ WITH THE CDF DETECTOR. FERMILAB-PUB-99-225-E, Sep 1999. Phys.Rev.D61:072005,(2000)

7. T. Affolder, *et al.,* MEASUREMENT of b QUARK FRAGMENTATION FRACTIONS IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-243-E, Sep 1999. Phys.Rev.Lett.84:1663-1668(2000)

8. T. Affolder, *et al.*, SEARCH FOR A FOURTH GENERATION QUARK MORE MASSIVE THAN THE $Z^0$ BOSON IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-256-E, Sep 1999. Phys.Rev.Lett.84:835-840,(2000)

9. T. Affolder, *et al.*, MEASUREMENT OF THE HELICITY OF W BOSONS IN TOP QUARK DECAYS. FERMILAB-PUB-99-257-E, Sep 1999. Phys.Rev.Lett.84:216-221,(2000)

10. T. Affolder, *et al.*, PRODUCTION OF $\Upsilon(1S)$ MESONS FROM $\chi_b$ DECAYS IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-301-E, Oct 1999. Phys.Rev.Lett.84:2094-2099,(2000)

11. T. Affolder, *et al.*, SEARCH FOR SCALAR TOP AND SCALAR BOTTOM QUARKS IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-311-E, Oct 1999. 10pp. Phys.Rev.Lett. 84:5704-5709, (2000)

12. T. Affolder, *et al.*, SEARCH FOR THE CHARGED HIGGS BOSON IN THE DECAYS OF TOP QUARK PAIRS IN THE E TAU AND MUON TAU CHANNELS AT $\sqrt{s} = 1.8$ TeV, Phys.Rev.D62:012004,(2000)

13. T. Affolder, *et al.*, OBSERVATION OF ORBITALLY EXCITED B MESONS IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-330-E, Nov 1999. 33pp. Submitted to Phys.Rev.D

14. T. Affolder, *et al.*, SEARCH FOR SCALAR TOP QUARK PRODUCTION IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-340-E, Nov 1999. 18pp. Phys.Rev.Lett.84:5273-5278, (2000)

15. T. Affolder, *et al.*, A MEASUREMENT OF THE DIFFERENTIAL DIJET MASS CROSS-SECTION IN $p\overline{p}$ COLLISIONS AT $\sqrt{s} = 1.8$ TeV FERMILAB-PUB-99-360-E, Dec 1999. Phys.Rev.D61:091101,(2000)

16. T. Affolder, *et al.*, Search for New Particles Decaying to $t\overline{t}$ in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV; FERMILAB-Pub-00/051-E ; March, 2000 Phys.Rev.Lett.85:2062-2066 (2000)

17. T. Affolder, *et al.*, Diffractive Dijets with a Leading Antiproton in $\overline{p}p$ Collisions at $\sqrt{s} = 1800$ GeV FERMILAB-Pub-00/055-E, Phys.Rev.Lett.84:5043(2000)

18. T. Affolder, *et al.*, Measurement of $J/\psi$ and $\psi(2S)$ polarization in $p\overline{p}$ collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/090-E, May, 2000 Phys.Rev.Lett.85:2886-2891 (2000)

19. T. Affolder, *et al.*, Direct Measurement of the W Boson Width in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/085-E, May, 2000 Phys.Rev.Lett.85:3347-3352 (2000)

20. T. Affolder, *et al.*, Search for Color Singlet Technicolor Particles in $p\overline{p}$ collisions at $\sqrt{s} = 1.8$ TeV, Phys.Rev.Lett.84:1110-1115,(2000)

21. T. Affolder, *et al.*, Limits on Gravitino Production and New Processes with Large Missing Transverse Energy in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-00/064-E, May, 2000 Phys.Rev.Lett.85:1378-1383, (2000)

22. T. Affolder, *et al.*, Measurement of $d\sigma/dy$ for High Mass Drell-Yan $e^+e^-$ Pairs from $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-00/133-E, June, 2000 Phys.Rev.D63:011101 (2001)

23. T. Affolder, *et al.*, Measurement of the Top Quark Mass with the Collider Detector at Fermilab, FERMILAB-Pub-00/127-E, June, 2000 Phys.Rev.D63:032003 (2001)

24. T. Affolder, *et al.*, Search for Second and Third Generation Leptoquarks Including Production via Technicolor Interactions in $p\overline{p}$ collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-00/073-E, June, 2000 Phys.Rev.Lett.85:2056-2061, (2000)

25. T. Affolder, *et al.*, Dijet Production by Double Pomeron Exchange at the Fermilab Tevatron FERMILAB-Pub-00/098-E, May, 2000 Phys.Rev.Lett.85:4215-4220 (2000)

26. T. Affolder, *et al.*, Tests of Enhanced Leading Order QCD in W Boson plus Jets Events from 1.8 TeV $\overline{p}p$ Collisions, FERMILAB-Pub-00/196-E, August, 2000 Phys.Rev.D63:072003 (2001)

27. T. Affolder, *et al.*, Measurement of the Decay Amplitudes of $B^0 \to J/\psi K^{*0}$ and $B_s^0 \to J/\psi\phi$ Decays, FERMILAB-Pub-00/165-E, August, 2000 Phys.Rev.Lett.85: 4668-4673 (2000)

28. T.Affolder, *et al.*, Measurement of the W Boson Mass With the Collider Detector at Fermilab, FERMILAB-PUB-00/158-E, July, 2000 Phys.Rev.D64:052001 (2001)

29. T. Affolder, *et al.*, Measurement of the Top Quark $p_T$ Distribution, FERMILAB-Pub-00/101-E, Phys.Rev.Lett.87:102001 (2001)

30. T. Affolder, *et al.*, Search for Neutral Supersymmetric Higgs Bosons in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/258-E, Phys.Rev.Lett.86:4472-4478 (2001)

31. T. Affolder, *et al.*, Production of $\chi_{c1}$ and $\chi_{c2}$ in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/287-E, November, 2000 Phys.Rev.Lett.86:3963-3968 (2001)

32. T. Affolder, *et al.*, Measurement of the $t\bar{t}$ Production Cross Section in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-01/007-E, Phys.Rev.D64:032002 (2001)

33. T. Affolder, *et al.*, Measurement of the Inclusive Jet Cross Section in $\overline{p}p$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-01/008-E, Phys.Rev.D64:032001 (2001)

34. T. Affolder, *et al.*, First Measurement of the Ratio $B(t \to Wb)/B(t \to Wq)$ and Associated Limit on the CKM Element $|V(tb)|$ FERMILAB-Pub-00/340-E, January, 2001 Phys.Rev.Lett.86:3233-3238 (2001)

35. T. Affolder, *et al.*, Search for the Supersymmetric Partner of the Top-Quark in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/288-E, December, 2000 Phys.Rev.D63:091101 (2001)

36. T. Affolder, *et al.*, Measurement of the Two-Jet Differential Cross Section in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV FERMILAB-Pub-00/311-E, December, 2000 Phys.Rev.D64:012001 (2001)

37. T. Affolder, *et al.*, Search for Narrow Diphoton Resonances and for $\gamma$ + W/Z Signatures at $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-PUB-01/073-E, May, 2001, Submitted to Phys.Rev.D.

38. T. Affolder, *et al.*, Double Diffraction Dissociation at the Fermilab Tevatron Collider, FERMILAB-PUB-01/063-E, May, 2001, Submitted to Phys.Rev.Lett.

39. T. Affolder, *et al.*, Search for Gluinos and Scalar Quarks in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV Using the Missing Energy plus Multijets Signature, FERMILAB-PUB-01/084-E, Submitted to Phys.Rev.Lett.

40. T. Affolder, *et al.*, Cross-Section and Heavy Quark Composition of $\gamma + \mu$ Events Produced in $p\overline{p}$ Collisions, FERMILAB-PUB-01/087-E, June, 2001, Submitted to Phys.Rev.D.

41. T. Affolder, *et al.*, Searches for New Physics with a Photon and B Quark Jet at CDF, FERMILAB-PUB-01/097-E, June, 2001, Submitted to Phys.Rev.D.

42. T. Affolder, *et al.*, Measurement of $d\sigma/dM$ Forward Backward Charge Asymmetry for High Mass Drell-Yan $e^+d^-$ Pairs from $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/116-E, July, 2001, Submitted to Phys.Rev.Lett.

43. T. Affolder, *et al.*, Search for Quark Lepton Compositeness and a Heavy $W'$ Boson Using the $e - \nu$ Channel in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV,

44. T. Affolder, *et al.*, Charged Particle Multiplicity in Jets in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-PUB-01/106-E, July, 2001, Submitted to Phys.Rev.Lett.

45. T. Affolder, *et al.*, Search for New Heavy Particles in the $W/Z^0$ Final State in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-PUB-01/219-E, August, 2001.

46. T. Affolder, *et al.*, A Study of $B^0 \to J/\psi K^{*0}\pi^+\pi^-$ Decays with the Collider Detector at Fermilab, FERMILAB-PUB-01/232-E, August, 2001.

47. T. Affolder, *et al.*, Search for Gluinos and Squarks Using Like-Sign Dileptons in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-PUB-01/111-E, July, 2001.

48. T. Affolder, *et al.*, Search for Gluinos and Scalar Quarks in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV using the Missing Energy plus Multijets Signature, FERMILAB-PUB-01/084-E, July, 2001.

49. T. Affolder, *et al.*, Cross Section and Heavy Quark Composition of $\gamma + \mu$ Events Produced in $p\overline{p}$ Collisions, FERMILAB-Pub-01/087-E June, 2001

50. D. Acosta, *et al.*, Study of the heavy flavor content of jets produced in association with W bosons in $p\overline{p}$ collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/253-E, September, 2001.

51. D. Acosta, *et al.*, Search for New Physics in Photon-Lepton Events in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/298-E, October, 2001.

52. T. Affolder, *et al.*, Observation of diffractive J/$\psi$ production at the Fermilab Tevatron, FERMILAB-Pub-01/225-E, Aug, 2001.

53. T. Affolder, *et al.*, A Study of $B^0 \to J/\psi K^{(*)0}\pi^+\pi^-$ Decays with the Collider Detector at Fermilab, FERMILAB-Pub-01/232-E, August, 2001

54. T. Affolder, *et al.*, Charged Jet Evolution and the Underlying Event in $p\overline{p}$ Collisions at 1.8 TeV, FERMILAB-Pub-01/211-E, August, 2001

55. T. Affolder, *et al.*, Search for Quark-Lepton Compositeness and a Heavy W' Boson Using the $e\nu$ Channel in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/222-E, August, 2001

56. D. Acosta, *et al.*, Diffractive dijet production at $\sqrt{s} = 630$ GeV and 1800 GeV at the Fermilab Tevatron, FERMILAB-Pub-01/299-E, October, 2001

57. T. Affolder, *et al.*, Search for New Heavy Particles in the $WZ^0$ Final State in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/219-E.

58. D. Acosta, *et al.*, Search for the Decay $B_s \to \mu^+\mu^-\phi$ in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/293-E, Oct, 2001

59. D. Acosta, *et al.*, Search for Single-Top-Quark Production in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/318-E, Sept, 2001

60. D. Acosta, *et al.*, Soft and Hard Interactions in $p\overline{p}$ Collisions at $\sqrt{s} = 1800$ and 630 GeV, FERMILAB-Pub-01/345-E, November, 2001

61. D. Acosta, *et al.*, Measurement of the $B^+$ Total Cross Section and $B^+$ Differential Cross Section $d\sigma/dp_T$ in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/347-E, November, 2001

62. T. Affolder, *et al.*, Measurement of the Strong Coupling Constant from Inclusive Jet Production at the Tevatron $\overline{p}p$ Collider, FERMILAB-Pub-01/246-E, January, 2002

63. D. Acosta, *et al.*, $\Upsilon$ Production and Polarization in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV, FERMILAB-Pub-01/355-E, January, 2002.

64. D. Acosta, *et al.*, Comparison of the Isolated Direct Photon Cross Sections in $p\overline{p}$ Collisions at $\sqrt{s} = 1.8$ TeV and $\sqrt{s} = 0.63$ TeV, FERMILAB-Pub-01/390-E, January, 2002.

**E665**


1. M.R. Adams, *et al.*, A Spectrometer for Muon Scattering at the Tevatron, Nucl. Instrum. Meth. A291:533,(1990)

2. M.R. Adams, *et al.*, Distribution of Charged Hadrons Observed in Deep-Inelastic Muon-Deuterium Scattering at 490 GeV, Phys. Lett.B272:163,(1991)

3. M.R. Adams, *et al.*, Saturation of Shadowing at Very Low $x_{Bj}$, Phys.Rev.Lett. 68: 3266,(1992)

4. M.R. Adams, *et al.*, First Measurement of Jet Production Rates in Deep-inelastic Lepton-Proton Scattering, Phys.Rev.Lett.69:1026,(1992)

5. M.R. Adams, *et al.*, Shadowing in the muon-xenon inelastic scattering cross section at 490 GeV, Phys.Lett.B,287:375,(1992)

6. M.R. Adams, *et al.*, An Investigation of Bose-Einstein Correlations in Muon-Nucleon Interactions at 490 GeV, Phys.Lett.B,308:418,(1993)

7. M.R. Adams, *et al.*, Measurement of the ratio $\sigma_n/\sigma_p$ in inelastic muon–nucleon scattering at very low $x$ and $Q^2$, Phys.Lett.B,309:477,(1993)

8. M.R. Adams, *et al.*, Perturbative QCD Effects Observed in 490 GeV Deep-Inelastic Muon Scattering, Phys.Rev.D,48:5057,(1993)

9. M.R. Adams, *et al.*, $Q^2$ Dependence of the Average Squared Transverse Energy of Jets in Deep-Inelastic Muon-Nucleon Scattering with Comparison to QCD Predictions, Phys.Rev.Lett.72:466,(1994)

10. M.R. Adams, *et al.*, Production of Charged Hadrons by Positive Muons on Deuterium and Xenon at 490 GeV, Z.Phys.C,61:179,(1994)

11. M.R. Adams, *et al.*, Production of Neutral Strange Particles in Muon-Nucleon Scattering at 490 GeV, Z.Phys.C61:539-550,(1994)

12. M.R. Adams, *et al.*, Scaled Energy (z) Distributions of Charged Hadrons Observed in Deep–Inelastic Muon Scattering at 490 GeV from Xenon and Deuterium Targets, Phys.Rev.D,50:1836,(1994)

13. M.R. Adams *et al.*, Large Density and Correlation Integrals in Deep-Inelastic Muon-Nucleon Scattering at 490 GeV, Phys. Lett. B:335, 535 (1994)

14. M.R. Adams *et al.*, Nuclear Shadowing, Diffractive Scattering and Low Momentum Protons in $\mu$Xe Interactions at 490 GeV, Z.Phys. C65: 225 (1995)

15. M.R. Adams *et al.*, Measurement of Nuclear Transparencies from Exclusive $\rho^0$ Meson Production in Muon-Nucleus Scattering at 470 GeV, Phys. Rev. Lett. 74:1525 (1995)

16. M.R. Adams *et al.*, Nuclear Decay following Deep Inelastic Scattering of 470 GeV Muons, Phys. Rev. Lett., 74:5198 (1995)

17. M.R. Adams *et al.*, Extraction of the ratio $F_2^n/F_2^p$ from Muon-Deuteron and Muon-Proton Scattering at Small $x$ and $Q^2$, Phys. Rev. Lett. 75:1466, (1995)

18. M.R. Adams *et al.*, Shadowing in Inelastic Muon Scattering off Carbon, Calcium and Lead at Low $x_{Bj}$, Zeit. Phys. C67: 403 (1995)

19. M.R. Adams *et al.*, Determination of the gluon distribution function of the nucleon using energy-energy angular pattern in deep-inelastic muon-deuteron scattering, Zeit. Phys. C71: 391, (1996) FNAL-Pub-95/395-E

20. M.R. Adams *et al.*, Proton and Deuteron Structure Functions in Muon Scattering at 470 GeV, Phys. Rev. D54: 3006, (1996) FNAL-Pub-95/396-E

21. M.R. Adams *et al.*, Diffractive Production of $\rho^0$ (770) Mesons in Muon-Proton Interactions at 470 GeV ; Z. Phys. C74: 237, (1997)

22. M.R. Adams *et al.*, Inclusive Single-Particle Distributions and Transverse Momenta of Forward Produced Charged Hadrons in $\mu$-p Scattering at 470-GeV, Z.Phys.C76:441-463,1997

23. M.R. Adams *et al.*, Lambda and Anti-Lambda Polarization From Deep Inelastic Muon Scattering, Eur.Phys.J.C17:263-267, (2000)

**BC72/73**


1. K. Abe, *et al.*, Lifetimes of Charmed Particles Produced in a 20 GeV $\gamma p$ Experiment, Phys. Rev. Lett. **48**, 1526, (1982).

2. K. Abe, *et al.*, Charm Photoproduction Cross Section at 20 GeV, Phys. Rev. Lett. **51**, 156, (1983).

3. K. Abe, *et al.*, Inclusive Photoproduction of Neutral Strange Particles at 20 GeV, Phys. Rev. D **29**, 1877, (1984).

4. K. Abe, *et al.*, Charm Photoproduction at 20 GeV, Phys. Rev. D **30**, 1, (1984).

5. K. Abe, *et al.*, Search for a Threshold Enhancement in the $\gamma p \rightarrow$ Charmed Baryon + Charmed Meson Cross-Section, Phys. Rev. D **30**, 694, (1984).

6. K. Abe, *et al.*, Study of the $\rho'(1600)$ Mass Region Using $\gamma p \rightarrow \pi^+\pi^- p$ at 20 GeV, Phys. Rev. Lett. **53**, 751, (1984).

7. K. Abe, *et al.*, Test of s-channel helicity conservation in inelastic $\rho^0$ diffraction in 20-GeV photoproduction, Phys. Rev. D **32**, 2288, (1985)

8. K. Abe, *et al.*, Inclusive photoproduction of strange baryons at 20 GeV, Phys. Rev. D **32**, 2869, (1985)

9. K. Abe, *et al.*, Lifetimes, cross sections, and production mechanisms of charmed particles produced by 20-GeV photons, Phys. Rev. D **33**, 1, (1986)

10. V. O'Dell, *et al.*, Forward charge asymmetry in 20-GeV $\gamma p$ reactions, Phys. Rev. D **36**, 1, (1986)

11. J.E. Brau, *et al.*, Production and Decay Properties of the $\omega\pi^0$ state at 1250 MeV/c$^2$ Produced by 20 GeV Polarized Photons on Hydrogen, Phys. Rev. D **37**, 2379, (1988)

12. E.S. Ackleh, *et al.*, A Search for a Short Lived Axion Decaying to e$^+$ e$^-$ in a 20-GeV Photoproduction experiment, SLAC-PUB-4473, Aug 1989. Submitted to Phys. Rev. D

13. G.T. Condo, *et al.*, Charge Exchange Photoproduction of the A2(1320) in Association with $\Delta^{++}$ at 19.3-GeV/c. Phys. Rev. D41 (1990) 3317-3323.

14. G.T. Condo, *et al.*, Photoproduction of an Isovector $\rho\pi$ State at 1775-MeV. Phys. Rev. D43 (1991) 2787-2791.

## Computing/Physics

1. Frank Rinaldo, Stephen Wolbers, Loosely Coupled Parallel Processing at Fermilab, Computers in Physics, Vol 7, 184-190 (March/April, 1993). FERMILAB-Pub-93-006.

2. Elizabeth Anderson, *et al.*, A Virtual Library of Technical Publications, Presented at 6th International World Wide Web Conference, Santa Clara, CA 7-12 Apr, 1997 and at Inforum'97, Oak Ridge TN, 6-8 May, 1997, FERMILAB-TM-2004-REV, October, 1997.

3. R. Cudzewicz, et al., Next Generation Farms at Fermilab, Computer Physics Communications 110: 1317 (1998).

4. Stephen Wolbers, Strategic Directions of Computing at Fermilab, Comp. Phys. Comm. 110: 1285 (1998).

5. 'Design and First Tests of the CDF Run 2 Farms', Jaroslav Antos, et al., presented at CHEP2000, Padova, Italy, Febrary 7-11, 2000 (FERMILAB-Conf-00/095), Comp. Phys. Comm. 140: 239 (2001).

Stephen Wolbers

**Committee, Conference and Review Assignments**

1. Member, 8mm/Serial Media Working Group, Computing Division, 1990.
2. Member, Word Processing Subcommittee, 1985.
3. Member, Ad-Hoc Committee on the Common File Server, 1989.
4. Member, SDSS software review, 1992 and 1996.
5. Member and co-leader, Fermilab Publications Fileserver Committee 1995-present
6. Member, CDF godparents review committee: Upgrade Software, 1996
7. Member, Fermilab Computer Security Working Group, 1998-present.
8. Member, Run II Joint CDF/D0/CD Committee 1996-present
9. Member, LHCC Consultants Group (LCG) to review Computing for the LHC experiments, January, 1997 – January, 2000*
10. Member, RHIC Computing Review Committee, 1997-present*
11. Member, Fermilab Policy Manual Working Group, 1998.
12. Head, Fermilab BSS Critical Systems Working Group, June-December, 1999.
13. Head, Fermilab Beams Critical Systems Working Group, June-December, 1999.
14. Member, Brookhaven US ATLAS Project Advisory Panel, Jan, 2000-present*
15. Organizer, NSS Conference, Lyon, France, October, 2000.
16. Co-convener, Commodity Hardware and Software Session, CHEP2000, Padova, Italy, February, 2000.
17. Co-convener, Commodity Hardware and Software Session, CHEP2001, Beijing, China, 3-7 Sept, 2001.
18. Member, Compensation Committee (headed by Kay Van Vreede of Lab Services), Feb, 2000 to present.
19. Member, Organizing Committee for the Fermi Centennial (headed by Chris Quigg and Jeff Appel), May, 2001-September, 2001.

* External committee

Stephen Wolbers

Training

1. Supervisory Training (for group leaders), Fermilab, January-April, 1993.
2. Fast Track to Objects, January 6, 1999.
3. C++ for non-C Programmers, January 22-March 5, 1999 (1/2 day per week).
4. Leadership/Management Training, given by the MRA - the Northern Illinois Business Association, March-April, 1999.

Stephen Wolbers
Invited Talks

1. 'Petabyte-Scale Computing for High Energy Physics', presented at the monthly meeting of the Chicago chapter of ACM, October 17, 2001. (home.fnal.gov/ wolbers/acm_101701.pdf)

2. 'Computing as a Tool for High Energy and Nuclear Physics', Jefferson Lab Colloquium, April 25, 2001. (home.fnal.gov/ wolbers/jeffersonlab.pdf)

3. 'Computing as a Tool for High Energy and Nuclear Physics', University of Illinois, Chicago, Physics Colloquium, March 28, 2001. (home.fnal.gov/ wolbers/uic_032801.pdf)

4. 'Physics at Fermilab', invited talk at the HEPiX (High Energy Physics UNIX) meeting, Fermilab, August 26-28, 1998.

5. 'Commodity Hardware and Software Summary', Stephen Wolbers, presented at CHEP97, Berlin, Germany, April 7-11, 1997

6. 'Strategic Directions of Computing at Fermilab', Stephen Wolbers, presented at CHEP97, Berlin, Germany, April 7-11, 1997

7. '$\sigma_n/\sigma_p$ and Structure Functions Measured in 470 GeV Muon Scattering', Stephen Wolbers, presented at SLAC, March 21, 1995.

8. 'Analyzing Terabytes of Data at Fermilab', Stephen Wolbers, presented at the 1994 Computing in High Energy Physics Conference, San Francisco, CA, April 20-27, 1994 (FERMILAB-Conf-94/112)

9. 'Structure Functions and $\sigma_n/\sigma_p$ Measured in 465 GeV/c Muon-Nucleon Interactions', S. Wolbers, presented at the XXIXth Recontres de Moriond, Meribel, France, March 19-26, 1994. (FERMILAB-CONF-94/139-E)

10. ‘Coarse-Grained Parallel Computing in HEP’, Stephen Wolbers, presented at the 1993 Joint April Meeting of the APS, Washington, DC, April 12-15, 1993

11. ‘Software for Parallel Processing Applications’, Stephen Wolbers, presented at the Computing in High Energy Physics Conference, Annecy, France, September 21-25, 1992 (FERMILAB-Conf-92/260) Published in CERN 92/07, 21 December 1992,P.111

12. ‘Deep Inelastic Muon Scattering at 490 GeV’, Stephen Wolbers, Indiana University Seminar, March 26, 1991

Stephen Wolbers
Principal Contributions to Conferences

**E665**

1. 'Deep Inelastic Muon Scattering at 500 GeV and 100 GeV', S. Wolbers, *et.al.*,, presented at the DPF Meeting of the APS, August 16, 1988, Storrs, CT FERMILAB-CONF-88/153-E (August, 1988)

2. 'Hadronic Final States in 490-GeV Muon Deep Inelastic Scattering', S. Wolbers, presented at the 20th Intl. Symposium on Multiparticle Dynamics, Gut Holmecke, Germany, September 10-14, 1990, In "Dortmund 1990, Proceedings, Multiparticle dynamics" 388-392. FERMILAB-CONF-90/233-E

**Computing**

1. 'The Farms Systems at Fermilab', Steve Wolbers and Frank Rinaldo, presented at the Clusters Workshop '92, Supercomputer Computations Research Institute, Tallahassee, Florida, Dec 2-4, 1992

2. 'Production Farms at Fermilab', Steve Wolbers, presented at the Clusters Workshop '93, Supercomputer Computations Research Institute, Tallahassee, Florida, Dec 7-9, 1993

3. 'Production Farms at Fermilab', Mark Fischler, Frank Rinaldo, and Stephen Wolbers, presented at CHEP94, San Francisco, CA, April 21-17, 1994 (FERMILAB-Conf-94/111)

4. 'Next Generation Farms at Fermilab', Ron Cudzewicz, Lisa Giacchetti, et al., presented at CHEP97, Berlin, Germany, April 7-11, 1997 (FERMILAB-Conf-97/043)

5. ‘PC Farms for Offline Event Reconstruction at Fermilab’, A. Beretvas, et al., presented at CHEP97, Berlin, Germany, April 7-11, 1997 (FERMILAB-Conf-97/077)

6. ‘Processing Farms Plans for CDF and D0 for RunII’, M. Breitung, et al., presented at CHEP98, Chicago, IL, August 31-Sept 6, 1998 (FERMILAB-Conf-98/360)

7. ‘Dedicated OO Expertise Applied to Run II Software Projects’, D. Amidei, et al., presented at CHEP2000, Padova, Italy, February 7-11, 2000. (FERMILAB-Conf-00/045)

8. ‘The CDF Run 2 Computer Farms’, presented by Pasha Murat at CHEP2001, Beijing, China, September, 2001.

**BC 72/73**

1. ’Inclusive Photoproduction of $\Lambda$ and $\overline{\Lambda}$ at 20 GeV’, Stephen Wolbers, presented at the Spring Meeting of the American Physical Society, 23-26 April, 1994

2. ‘Comparison of $\Lambda$ and $\overline{\Lambda}$ Inclusive Photoproduction at 20 GeV with a Quark-Diquark Fusion Model’, K. Abe, *et al.*,, submitted to the XXII International Conference on High Energy Physics, Leipzig, (1984)

Stephen Wolbers

Yearly Summary

**2001, logbooks 43-44, incomplete as of 9/3/01** In 2001 the CDF farms reached full production. Therefore, much work was done during the year to ensure that the farms performed as required for the CDF collaboration. Early in the year that meant getting the farms to function properly for the first set of data, taken in March-April, 2001. This included ensuring that some of the complicated splitting of the output data worked properly. In June-July the data-taking rate was so high that the farms fell way behind. This required a dedicated effort with the data-handling people to increase the throughput of the farms/DH systems. Due to unexpected accelerator downtime the farms caught up. Later in August-September the trigger rates were reduced and the farms could theoretically keep up. However, problems with the number of tapes and with the code kept the farms from running during the first part of that period. Because of all of this the farms started a "Super-Express" in late summer. This was a special production of the Express Stream (Stream A). The idea was to reconstruct some data as quickly as possible with whatever calibrations are available at the time. It ran on fcdfsgi2 (the O2000) since that is where the input files were automatically copied by the online/logger system.

Also during 2001 the CDF farms had shifters assigned to them. This required training, documentation, etc. This started early (March) and for a long time the shifters spent most of their time debugging code problems and related issues rather than running the farms.

I worked on many issues during 2001, including B0 networking, miniBooNE networking, ROOT user's guide, tape drive for run 2, the UIP project for the Feynman Computing Center, MINOS computing support, interviews, computer security and the computer security peer review, meeting with visitors from Okinawa, the Czech Republic, etc, Run 2b computing planning, compensation committee (described in 2000), LAM meetings, Scheduling Meetings, All Experiments meetings, software copyright, miniBooNE software support, meetings with Mike Shaevitz, Run 2 PMGs, Finnish coop students, Associate Scientist search (resulted in hiring Stephen Mrenna), postdoc search (resulted in Robert Illingworth), budgets, farms management,

I worked closely with Don Petravick and Bonnie Alcorn on mass storage for the lab during 2001. This included providing allocations to experiments, pushing people to use mass storage whenever possible, and helping with the HPSS migration.

I worked on the WPAS (the lab's budget request) for CD as usual. This includes writing some of the sections and reviewing all of the CD sections.

During January I attended the ATLAS PAP. This time I reviewed and wrote the sections on computing and on the muon drift tubes.

I was involved in CHEP2001, held in Beijing in September, 2001. I wrote an abstract, a paper and a talk about the CDF farms. This was to be given in the Commodity Hardware and Software Session. I was the convener (with Richard Baker of Brookhaven) of that session. Much work was required to pick the best talks for the session, as the number of talks allowed was small compared to the number of abstracts submitted. I was not able to attend, due to the DOE reduction in trips to this conference and due to time constraints.

I was a member of the Fermi Centennial Celebration planning committee. I was not able to provide a large amount of support and mainly helped to suggest possible speakers for the celebration. I was out of town during the celebration.

I was a lecturer for the CERN School of Computing, held in Santander, Spain, in late September, 2001.

I gave a talk to the ACM, Chicago Chapter, October 17, 2001.

I worked on SC2001, held in Denver, November, 2001.

I attended Snowmass 2001 in July, 2001. Snowmass was billed as determining the future of High Energy Physics, at least in the United States of America. This may or may not be true, but at least it brought together a very large number of physicists to discuss possible futures. I attended technical sessions about accelerators, with the goal of learning as much as possible about linear colliders, both warm and superconducting. This I accomplished and I felt quite confident at the end of the workshop that I could discuss important issues about linear colliders and actually understand them. To actually progress would require actually working on the technology.

**2000, logbooks 40-42** In 2000 I attended the CHEP2000 conference in Padova, Italy. I was a co-convener of the Commodity Hardware and Software and Integration in Farm and Large Systems session and I delivered talks in that session and in the Data Analysis, Abstracts and Methods Session. The first talk was about the CDF farms, the second about the OO experts that were hired for Run II. The conference was a good place to learn about the latest ideas in computing, both in HEP and elsewhere.

2000 was the final year for the joint CD/CDF/D0 Run II Computing project. The main software and hardware projects were fully functioning and continued beyond

2000. The joint projects were a success. The pressure of actually commissioning and running the two software projects (CDF and D0) eventually led to a split in most of the activities. However, communication continued in the once/month Department Heads meeting which focussed on Run 2 issues.

In January I attended the ATLAS Physics Advisory Panel (PAP) meeting at Brookhaven. This was my first attendance at the PAP and I was asked to review computing.

The CDF farms were a large part of my work during 2000. The farms were ramping up from prototype to production and from Monte Carlo and test data to Commissioning data. We were also making a transition from Tony Chan, the previous expert, to Miroslav Siket, a graduate student from Slovakia. The work was pretty steady, and involved weekly videoconferences with people in Taiwan, CERN and Slovakia, meetings with the rest of the CDF offline group, and various technical tasks. By the end of the year 2000 the farms were able to reconstruct large numbers of raw data events and write the output into the CDF data handling system.

I worked on the laboratory's compensation committee. This committee was formed to address some of the comments that came from the labwide survey done in 1999. The committee was formed to address the issues of salary, how raises are given, possible bonuses or other forms of compensation, etc. The committee met every 2 weeks and worked hard to come up with a new yearly performance evaluation, which is meant to tie salary increases to job performance.

During 2000 the Computing Division hired its first HEP postdoc. This was a good thing, and represents a new scientific capability of the division. I originally wrote the proposal for postdocs in CD, and am happy to see it happen.

During 2000 the Muon Lab was proposed and used for the first part of the PC QCD farm. My own experience with Muon Lab was helpful in making this happen.

There were the usual discussion with vendors. I tended to take the role as contact for SGI. CD has quite a substantial amount of SGI equipment and it makes some sense for CD to work with SGI if there is a real partnership. This was done in a few cases, but successes were not all that notable.

I called together people from CD and employment to discuss issues that were of concern to both parties. This has been repeated a few times in the hope that relations can be improved and procedures and processes can be made better. I arranged a meeting of Darryl Coburn, one of the best headhunters, with the Employment people, in the hope of making the working relationship better.

Some work was done in 2000 to write down the amount of support that would be needed for operations of the Run 2 computing systems. I had a small part in this work, especially for the farms.

I worked a little on computer security. My role was mostly indirect, except in two cases. I helped with the BSS and Beams critical security plans update, which were due in January. Beams went smoothly, BSS required more negotiation with Tom Nash and others to reach agreement on a plan. I also spent a great deal of time working with Judy Nicholls and Bruce Chrisman on user validation. I was primarily concerned about not cutting off physicists who were heavily involved in work at the lab.

I continued to take a major role in the laboratory's computer farms. I attend all farms users meeting, allocate the farms to different experiments based on priority and need, and try to watch the farms for future developments.

I helped to arrange meetings to discuss MOUs and support for major experiments, including MINOS and miniBooNE.

I discuss safety issues of the division with Gerry and others more or less steadily during the year.

The UPS/generator system for the Computing Division was a project which I pushed strongly, given the disruptions of normal power outages. The project finally was moving towards full implementation in 2000.

I attended Supercomputer2000 (SC2000) in Dallas Texas. Fermilab and SLAC combined to build a rather large and impressive display. This display had a big impact and drew many people from all over the show. I worked the show and spent some time organizing and then recapping the process.

The computer operators contract expired in October. The negotiations for the new contract took longer than in the past and there was even a chance that a strike would occur. I worked with Jeff Mack to prepare for any eventuality. Luckily, no disruptions occurred and the computer operations continued without interruption.

In late November Adam Walters and I met with Dave Carlson (head of BSS) to discuss loans of equipment to other institutions. The DOE and BSS were thinking about a narrow definition of loans that would only include loans to institutions actually collaborating at Fermilab on Fermilab experiments. The sense that I had was that the Directorate would like to allow loans to any DOE/NSF institution, if we had the equipment. They also would like to see loans for educational purposes. I convinced Dave Carlson that this was the case and that loans should continue to be processed and approved for these purposes.

Towards the end of 2000 the yearly RCF review occurred at Brookhaven. I participated in the review and was as usual impressed with the ability of that small team to support the large computing operations of the RHIC scientific program.

**1999** In 1999 there were a variety of tasks which I worked on. These included CDF farms, computer security, a small amount of E665 work, some review committee work, and of course a large number of things which were part of my responsibility as the Deputy Head of the Computing Division.

Starting with CDF this year was a year of great progress in establishing and operating the first small farms for CDF offline. The year progressed from the initial tests on a small farm through to a almost-completed small mock data challenge (MDC1) with the farm connected to other offline systems and databases in the CDF offline. The group during that year documented the studies and tests that were performed on a small farm, discussed and wrote a general design for the farm, wrote many of the software modules required for the farm, and finally connected the system successfully to other systems in CDF. The farms also successfully completed an internal CDF review on Sept 2, 1999. My role as co-leader of the farm effort kept me busy though I did very little or no direct technical work. Instead I acted as an advisor and schedule-maker and coordinator for others working directly on the farms. All in all this was a successful effort though there is still work to be done before the system is complete and running on full Run 2 data rates.

A second major task which I was associated with during 1999 was computer security. During June I was appointed to lead two different reviews of critical systems at Fermilab – the BSS systems and the Beams controls systems. The reviews started slowly during the summer, mostly because of vacations, but from September until December were very intense and extremely time consuming. The review committees each wrote a report with options for action (or non-action) which were delivered to the Directorate and to the Computer Security Working Group. In addition to this special role I also participated in computer security presentations to DOE security personnel (April), the GSA (July) and more and different DOE and contractor personnel (October).

On the scientific side E665 worked on and finalized a paper and I was a member of the committee which was responsible for reviewing the result and helped to put the paper in shape. This is likely the final paper from E665. In CDF I attended the B physics meetings as regularly as possible. I did not actively participate in any analysis.

As Deputy Division Head I was kept very busy with many duties including budget, Run II, computer security (mentioned above), meetings, standing in as Division Head in Matthias' absence, etc. The job is not overwhelming but does have enough to keep a person busy most of the time. The work is enjoyable most of the time, though the lack of free time for taking care of small things during the day is sometimes rather difficult to work around. The Division is running well and is accomplishing its goals in most cases. The extra pressures of Y2K and computer security are making life difficult, especially given the tight budget of 2000.

Finally, I was involved in other committee work. This work includes the review of RHIC computing. I have recently been added to the Brookhaven US ATLAS Project Advisory Panel. I plan to use this opportunity to learn more about the Computing which is being planned for ATLAS. I took a short trip to SLAC during December to catch up with contacts there again to learn what is going on at that laboratory in computing.

**1998** During 1998 I was heavily involved in the management of the Computing Division and in the transition of Computing Division Head from Joel Butler to Matthias Kasemann. The first part of the year was uncertain, as the choice of Division Head to replace Joel was not yet made. Once the decision was made much work was done to bring Matthias up to speed. He visited about one week per month starting in April before finally arriving for good on October 1. From approximately July 1 to October 1 I was acting Head of the Computing Division, filling the gap between Joel and Matthias.

In CDF the production or farms group was formed and started to make progress during this year. I became co-chairman of the group, along with Yen-Chu Chen of Taiwan. We formed the group and organized the effort that will be required to specify, design, build and operate the large computing farms. By the end of 1998 we were meeting with the entire production group in video conferences every two week (with Taiwan and CERN and Slovakia), had written a basic design and requirements note for the farms (CDF 4810) and were preparing to tackle the more detailed questions of software control and hardware requirements for the farms.

During 1998 I visited Brookhaven twice to review the computing for the RHIC Computing Facility (RCF), a facility which has computing demands very similar to those of Run II at Fermilab.

E665 is almost finished with data analysis and computing, but one paper on $\Lambda$ polarization continues to be worked on and I continue to be interested and to provide comments and suggestions whenever possible. In CDF I have been attending the B physics group meetings whenever possible in order to learn the details of the analyses that are being performed there, including the very nice $B_c$ results and the $\sin(2\beta)$ measurement.

Stephen Wolbers
Principal Unpublished Papers, Reports and Talks

## CDF

1. Jaroslav Antos, et al., CDF Production for Run II, CDF note 4810, November 15, 1998 (www-cdf.fnal.gov/cdfnotes/cdf4810_Run_II_farms.ps)

2. Jaroslav Antos, et al., 14 Node Test of the Prototype Farm, CDF Note 4941, April 5, 1999 (www-cdf.fnal.gov/cdfnotes/cdf4941_prototype_farm_test.ps)

3. Jaroslav Antos, et al., CDF Recommendations for FBS, CDF note 4942, March 29, 1999 (www-cdf.fnal.gov/cdfnotes/cdf4942_Farm_Batch_System.ps)

4. Jaroslav Antos, et al., The Analysis and General Design of the Run II Data Production Software System ; CDF note 4997, May 21, 1999

5. Jaroslav Antos, et al., Test PC-Farm for HEP Experiment applications, CDF note 5459, October 20, 2000.

6. Jaroslav Antos, et al., Performance Tests of the CDF Run 2 Production Farm, CDF note 5467, October 25, 2000.

7. James Amundson, et al., Database Offsite Export Report, CDF note 5539, January 10, 2001.

8. Jaroslav Antos, et al., Design of the Production Farm web interface, CDF note 5556, February 13, 2001.
(www-cdf.fnal.gov/cdfnotes/cdf4997_run2_prod_gen_design.ps)

9. B. Ashmanskas, et al., CDF CAF Review Report on Benchmarking, CDF 5743, October 9, 2001.

10. B. Ashmanskas, et al., Physics Analysis Computing Needs Assessment, CDF 5787, November 30, 2001.

11. B. Ashmanskas, et al., Final Report CDF CAF Review, Fall, 2001, CDF 5802, December 7, 2001.

## Computing in Physics

1. S. Wolbers, 'The Fermilab Farms in 1993', January 15, 1994.

2. S. Wolbers, 'The Fermilab Farms in 1994', January 11, 1995.

3. S. Wolbers, 'The Fermilab Farms in 1995', January 16, 1996.

4. S. Wolbers, 'The Fermilab Farms in 1996', FERMILAB-TM-2006, January 15, 1997.

5. S. Wolbers, 'The Fermilab Farms in 1997', FERMILAB-TM-2044, February 15, 1997.

6. Marina Albert, et al., 'The Fermilab Computing Farms in 1998', FERMILAB-TM-2076, March 15, 1999.

7. Marina Albert, et al., 'The Fermilab Computing Farms in 1999', FERMILAB-TM-2109, April 10, 2000.

8. Troy Dawson, et al., 'The Fermilab Computing Farms in 2000', FERMILAB-TM-2151, June, 2001.

## E665

1. 'Cathode Wire Placement Accuracy Criteria', S. Wolbers, E665 Note FS003 (February 2, 1985).

2. 'Investigation of One Anode Plane' S. Wolbers, E665 Note FS004 (March 29, 1985).

3. 'E665 Drift Chambers' T. Kirk, H. Melanson, S. Wolbers, E665 Note FS010 (October 23, 1985).

4. 'E665 Offline Software Users Guide', H. Melanson, D. Geesaman, C. Halliwell, S. Kunori, D. McCleod, A.M. Osborne, S. Wolbers, E665 Note SW007 (October 21, 1985).

5. ‘Summary of the Workshop on Radiation Damage to Wire Chambers’, S. Wolbers, E665 Note TR005 (Talk Transparencies) (Jan 30, 1986)

6. ‘The Second Stage Monte Carlo’ S. Wolbers, E665 Note TR009 (Talk Transparencies) (Mar 6, 1986)

7. ‘The E665 Drift Chamber Gas System’, S. Wolbers, E665 Note FS012 (April 16, 1986)

8. ‘The E665 Test Drift Chamber’, S. Wolbers, E665 Note FS013 (April 16, 1986)

9. ‘E665 Argon-Ethane Mixing and Sampling’, S. Wolbers, E665 Note FS014 (May 19, 1986)

10. ‘Progress with Drift Chambers’, S. Wolbers, E665 Note TR013 (Talk Transparencies) (May 29, 1986)

11. MC010 ‘The E665 Second Stage Monte Carlo Version 1.0’ S. Wolbers, E665 Note MC010 (July 1, 1986)

12. ‘Drift Chamber Software’ S. Wolbers, H. Melanson, E665 Note TR026 (Talk Transparencies), (September 4, 1986)

13. ‘An Investigation of Hit-Loss in the Drift Chambers due to MUTES’, S. Wolbers, H. Melanson, E665 Note FS018, (October 1, 1986)

14. ‘The E665 Second Stage Monte Carlo Version 3.0’, S. Wolbers, E665 Note MC010, addendum 1 (December 1, 1987)

15. ‘Variability of Drift Velocity in the E665 Drift Chambers’, S. Wolbers E665 Note FS019, (May 15, 1987)

16. ‘What the Heck is Wrong with DC2 ?’, S. Wolbers, E665 Note FS020, (May 27, 1987)

17. ‘Radioactive Source tests and Plateaus in the E665 Drift Chambers’, S. Wolbers, E665 Note FS022, (May 29, 1987)

18. 'The E665 Second Stage Monte Carlo Version 4.0', S. Wolbers, E665 Note MC010 addendum 2, (June 1, 1987)

19. 'Some Results of a Scan of 50 Events from tape WD0209', S. Wolbers, E665 Note BT044, (September 2, 1987)

20. 'Results of a Scan of 200 Events from tape WD0398', S. Wolbers, E665 Note BT048, (October 5, 1987)

21. 'Arguments for $H_2$ During this Run of E665', S. Wolbers, H. Melanson, S. Kunori, E665 Note TR053, (November 24, 1987)

22. 'The E665 Library', S. Wolbers, E665 Note GN022, (Dec 16, 1987)

23. 'Results of a Scan of 100 LAT events and 100 SAT events from tape WD1977(Xe)', S. Wolbers, E665 Note AN006, (January 1, 1988)

24. 'A Monte Carlo Study of $\nu$ and $Q^2$ of LAT-Triggered Events', S. Wolbers, E665 Note BT050, (January 4, 1988)

25. 'E665 Raw Tapes Summary', S. Wolbers, E665 Note AN013, (February 17, 1988)

26. 'E665 Drift Chamber Hardware Performance During the 1987-1988 Data Run', S. Wolbers, E665 Note FS025, (April 21, 1988)

27. 'Vertex Program Status', S. Wolbers, E665 Note ST0002, (April 21, 1988)

28. 'New Fermilab Computing Structure', S. Wolbers, E665 Note ST0003, (April 21, 1988)

29. 'First E665 reconstructed vertex', S. Wolbers, E665 Note ST0018, (May 27, 1988)

30. 'Vertex Program update', S. Wolbers, E665 Note ST0019, (June 2, 1988)

31. 'Clusters', S. Wolbers, E665 Note ST0025, (June 30, 1988)

32. 'Proposed E665 Tape Rules', S. Wolbers, E665 Note ST0027, (July 6, 1988)

33. 'CL T ERS', S. Wolbers, E665 Note ST0028, (July 7, 1988)

34. ‘PTA Displays’, S. Wolbers, E665 Note ST0032, (July 14, 1988)

35. ‘Keyplanes in E665 and a new RDMKEY Package’, S. Wolbers and S. Aid, E665 Note SW060, (August 5, 1988)

36. ‘Keyplanes in E665 and a new RDMKEY Package #2, S. Wolbers and S. Aid, E665 Note SW060, (August 19, 1988)

37. ‘A New TRANSLATE Package for MWPC’s in E665’, S. Wolbers, E665 Note SW061, (August 24, 1988)

38. ’Keyplane routines’, S. Wolbers, E665 Note ST0051, (August 11, 1988)

39. ‘Translate routines’, S. Wolbers, E665 Note ST0052, (August 11, 1988)

40. ‘Fermilab Computing information’, S. Wolbers, E665 Note ST0069, (September 15, 1988)

41. ‘AMDAHL disk space’, S. Wolbers, E665 Note ST0078, (October 6, 1988)

42. ‘AMDAHL disk space’, S. Wolbers, E665 Note ST0081, (October 13, 1988)

43. ‘Vertex Program Tests and Results’, S. Wolbers, A. Bhatti, E665 Note SW067, (November 1, 1988)

44. ‘Vertex program tests’, A. Bhatti, S. Wolbers, E665 Note ST0093, (November 3, 1988)

45. ‘Thickness of E665 DC’s’, S. Wolbers, E665 Note FS026, (November 10, 1988)

46. “DST” and data plots, A. Bhatti, S. Wolbers, E665 Note ST0101, (November 17, 1988)

47. ‘Display improvements’, S. Wolbers, E665 Note ST0102, (November 17, 1988)

48. ‘The E665 Vertex Processor; Version 1.0’, A. Bhatti, S. Wolbers, E665 Note SW071, (December 1, 1988)

49. ‘The E665 Vertex Processor User’s Guide ; Version 1.0’. A. Bhatti, S. Wolbers, E665 Note SW072, (December 1, 1988)

50. ‘Vertex Program Results on Data – I’, A. Bhatti, S. Wolbers, E665 Note AN028, (December 6, 1988)

51. ‘Vertex Program Results on Data - II’, A. Bhatti, S. Wolbers, E665 Note AN032, (December 26, 1988)

52. ‘LEVF status’, S. Wolbers, E665 Note ST0134, (January 26, 1989)

53. ‘AMDAHL status’, S. Wolbers, E665 Note ST0135, (January 26, 1989)

54. ‘Test Production Results’, S. Wolbers, E665 Note AN036, (February 24, 1989)

55. ‘Where is the x axis in E665? - I’, A. Bhatti, S. Wolbers, E665 Note AN037, (February 27, 1989)

56. ‘The E665 Vertex Processor; Version 2.0’, A. Bhatti, W. Wittek, S. Wolbers, E665 Note SW071, (March 1, 1989)

57. ’The E665 Vertex Processor User’s Guide ; Version 2.0’, A. Bhatti, W. Wittek, S. Wolbers, E665 Note SW072, (March 1, 1989)

58. ‘Amdahl Size Problems’, S. Wolbers, M. Schmitt, E665 Note SW081, (March 3, 1989)

59. ‘Production news’, S. Wolbers, E665 Note ST0179 (23 February, 1989)

60. ‘AMDAHL meeting’, S. Wolbers, E665 Note ST0173 (27 April, 1989)

61. ‘2nd stage Monte-Carlo’ S. Wolbers, E665 Note ST0174 ( 27 April, 1989)

62. ‘Dead wire simulation’ S. Wolbers, E665 Note ST0175 (27 April, 1989)

63. ‘Display including extrapolation to vertex’ S. Wolbers, E665 Note ST0176 (27 April, 1989)

64. ‘Dead Wires and the LDED Bank’, S. Wolbers, E665 Note SW086 (April 28, 1989)

65. ‘Dead tapes and file servers’, S. Wolbers, E665 Note ST0185 (4 May, 1989)

66. ‘PTMV Results’, S. Wolbers, E665 Note ST0187 (11 May, 1989)

67. ‘”Physics” dist. from LAT and MC tapes’, S. Wolbers, E665 Note ST0196 Wolbers, (17 May, 1989)

68. ‘”Physics” Distributions for LAT Filtered tapes and Monte Carlo tapes’ S. Wolbers, E665 Note AN043 (May 17, 1989)

69. ‘Cartridges on the Amdahl’, S. Wolbers, E665 Note SW087 (May 23, 1989)

70. ‘Cartridges on the AMDAHL’, S. Wolbers, E665 Note ST0197 (23 May, 1989)

71. ‘WI Split Tape Data Base’, S. Wolbers, McGraw, B., E665 Note SW096 (June 30, 1989)

72. ‘WI split tape data base’, S. Wolbers, E665 Note ST0204 (30 June, 1989)

73. ‘Production and tapes’, S. Wolbers, E665 Note ST0205 (6 July, 1989)

74. ‘Status of event reconstruction’, S. Wolbers, E665 Note ST0209 (14 July, 1989)

75. ‘E665 Tape Labeling Scheme’, S. Wolbers, B. McGraw, E665 Note SW097 (July 20, 1989)

76. ‘E665 Tape Strategy’ S. Wolbers, E665 Note SW098 (July 10, 1989)

77. ‘DC6U1 and the case of the missing wire’, S. Wolbers, E665 Note FS029 (August 2, 1989)

78. ‘Status of E665 Offline Analysis’, S. Wolbers, E665 Note SW101 (August 28, 1989)

79. ‘DC dead regions’, S. Wolbers, E665 Note ST0226 (21 September, 1989)

80. ‘The Location of the DC dead regions’ S. Wolbers, G. Gaidos, E665 Note SW105 (September 29, 1989)

81. ‘PTMV Production’, S. Wolbers, E665 Note SW106 (October 25, 1989)

82. ‘PTMV Production Status’, S. Wolbers, E665 Note ST0231 (November 9, 1989)

83. ‘PTMV Version 4.0’, S. Wolbers, E665 Note SW107 (November 16, 1989)

84. ‘PTMV Production’ S. Kunori, S. Wolbers, E665 Note ST0232 (November 16, 1989)

85. ‘The E665 Drift Chamber Gas System, v2’, S. Wolbers, E665 Note FS012 (November 20, 1989)

86. ‘DR Program’, S. Wolbers, E665 Note ST0239 (November 30, 1989)

87. ‘Production Status’, S. Wolbers, E665 Note ST0241 (December 7, 1989)

88. ‘The E665 DC Low Voltage System’, S. Wolbers, H. Melanson, E665 Note FS030 (December 1, 1989)

89. ‘Tape Staging on the Amdahl’, S. Wolbers, H. Melanson, E665 Note SW112 (January 9, 1990) Update #1 ; (March 15, 1990)

90. ‘The DR (Data Reduction) Program’, Wolbers, S., Bhatti, A., Jansen, D., Ecker, U., Schmitt, M., E665 Note SW113 (January 15, 1990)

91. ‘PTMV Production on 500 GeV 1987-88 Data’ S. Wolbers, E665 Note SW114 (January 24, 1990)

92. ‘E665 Gas System for the 1990 Run’, S. Wolbers, E665 Note FS035 (March 2, 1990)

93. ‘ Test of the Muon Lab Flammable Gas Exhaust System ; December 1, 1990 Wolbers, S., LaVoy, Brian, Northacker, David, E665 Note GN044

94. GN048 Lavoy, B., Paul, C., Wolbers, S., Addition of an ethane tank to E665’s gas system ; December 11, 1991

95. SW071 Bhatti, A., Wittek, W., Wolbers, S., The E665 Vertex Processor; Version 3.0; August 15, 1990

96. SW116 Wolbers, S., Reading 8 mm Tapes ; May 4, 1990

97. SW121 Wolbers, S., PTMV on RUN90 – Present Status ; June 7, 1990

98. SW122 Wolbers, S., Computing YCORNR and ZCORNR for the DC's ; Subroutine DCCORN ; July 13, 1990

99. AN076 Wolbers, S., E665 Drift Chamber Hardware Performance During the 1990 Data Run ; October 3, 1990

100. SW128 Wolbers, S., Long, M., PMTV on RUN90 Data – Final Sample During the Run ; November 1, 1990

101. SW135 Wolbers, S., et.al., E665 Code Conversion to UNIX on Silicon Graphics December 1, 1990 ; Version 1.0

102. PH036 Wolbers, S., K0 Production in E665 - I ; December 15, 1990

103. SW144 Wolbers, S., Error trapping in fortran on the Silicon Graphics ; January 22, 1991

104. MC010 Wolbers, S., The E665 Second Stage Monte Carlo; Version 5.0; February 1, 1991

105. SW147 Wolbers, S., Documentation of the UQPAM23 Release ; February 11, 1991

106. PH037 Wolbers, S., K0 Production in E665 - II ; March 11, 1991

107. SW151 Wolbers, S., Using the Debugger on the Silicon Graphics ; March 12, 1991

108. SW155 Kunori, McLeod, Wolbers, Tape I/O on the Silicon Graphics in E665 ; March 29, 1991

109. SW158 Wolbers, Stephen, PTMV Production on RUN87 Monte Carlo ; April 15, 1991

110. AN095 Wolbers, S., An investigation of deuterium efficiencies in Monte Carlo ; April 24, 1991

111. SW164 Wolbers, S., A test of needfile on fnsg01 ; April 30, 1991

112. FS037 Melanson, H., Wolbers, S., Emergency shutdown of the E665 Drift Chambers ; May 1, 1991

113. SW167 Wolbers, Stephen, Tests of E665 code on the Silicon Graphics ; June 7, 1991

114. AN110 Wolbers, Stephen, An investigation of deuterium efficiencies in Monte Carlo – II ; June 18, 1991

115. AN111 Wolbers, Stephen, Reconstruction efficiency as a function of the number of PC hits ; June 18, 1991

116. AN113 Wolbers, Stephen, A short history of the E665 gas crisis in 1991 ; August 12, 1991

117. AN115 Wolbers, S., Wirespacing and rotations in the DC's in E665 ; September 5, 1991

118. AN121 Wolbers, S., The second gas crisis of E665's RUN91 ; November 5, 1991

119. AN126 Wolbers, Stephen, Study of output streams of the main production on the UNIX farm ; December 26, 1991

120. AN132 Wolbers, Stephen, The DC x-positions ; January 24, 1992

121. SW184 Kaufman, Sheldon, and Wolbers, Stephen, cps, the farms, and E665 January 31, 1992

122. SW186 Wolbers, Stephen, Tape I/O on the farms ; May 19, 1992

123. SW188 Wolbers, Stephen, SGI-IBM UNIX ptmv comparison on one tape on the farm ; June 10, 1992

124. SW191 Wolbers, Stephen, SGI-IBM UNIX ptmv comparisons : Investigation of

125. SW193 Wolbers, Stephen, RUN90 PTMV Production : I - Code ; January 15, 1993 one event ; June 17, 1992

126. AN155 Wolbers, Stephen, The first 10% reconstruction of RUN90 : II - Summary July 15, 1992

127. AN156 Wolbers, Stephen, The first 10% reconstruction of RUN90 : III - DR90 July 30, 1992

128. AN165 Wolbers, Stephen, A filter for the full RUN90 Reconstruction November 1, 1992

129. AN171 Wolbers, Stephen, E665 Drift Chamber Hardware Performance During the 1991 Data Run ; January 9, 1993

130. SW194 Schell, John, and Wolbers, Stephen, The DR90 Program ; Jan 15, 1993

131. SW195 Wolbers, Stephen, A filter for the full RUN90 Reconstruction : Version 2 ; January 18, 1993

132. AN176 Kaufman, Sheldon, Wolbers, Stephen, RUN90 PTMV Production : II – Dependence of Results on Event Order ; February 15, 1993

133. SW196 Tim Carroll, Sheldon Kaufman, John Schell, Stephen Wolbers, The E665 CLUBS Users Guide ; March 4, 1993

134. SW197 Stephen Wolbers, RUN90 PTMV Production : II - Code Update ; April 23, 1993

135. SW198 Stephen Wolbers, Writing 8mm tapes from tcache sets on CLUBS ; May 1, 1993

136. SW199 Stephen Wolbers, The E665 CLUBS tcache interface ; May 1, 1993

137. AN190 Stephen Wolbers, YCORNR and ZCORNR for the DC's in RUN90 ; May 21, 1993

138. SW200 Stephen Wolbers, The One-Hadron Split and 3 of its subsplits : Multi-muon, rho, and V0 ; June 15, 1993

139. AN193 Stephen Wolbers, John Schell, RUN90 DR90 Production – Final Statistics ; July 22, 1993

140. AN194 Stephen Wolbers, RUN90 PTMV Production III – Final Statistics July 22, 1993

141. SW202 Sheldon Kaufman, Rob Kennedy, Stephen Wolbers, Using the SGI Machines on CLUBS ; July 29, 1993

142. SW204 Sheldon Kaufman, John Schell, Stephen Wolbers, Guide to Managing CPS Farm Production ; July 19, 1993

143. SW205 Stephen Wolbers, RUN91 PTMV Production I – Code ; October 1, 1993

144. AN200 Stephen Wolbers, YCORNR and ZCORNR for the DC's in RUN91 (and an update on RUN90) ; November 19, 1993

145. SW206 Stephen Wolbers, Normalization Splits of RUN90 : Beam Split, Off-target Split and EM Split ; November 20, 1993

146. SW209 Stephen Wolbers, The E665 FNALU Users Guide ; October 14, 1993

147. AN202 Stephen Wolbers, RUN90 PTMV Production IV – Run Block II Reruns ; January 20, 1994

148. SW213 Stephen Wolbers, RUN91 PTMV Production II – Code Updates ; January 20, 1994

149. SW214 Stephen Wolbers, The DR91 Program ; January 27, 1994

150. PH060 Stephen Wolbers, Neutral Strange Particles in RUN90 ; March 15, 1994

151. SW216 Stephen Wolbers, The e665clib.a library on UNIX ; May 11, 1994

152. SW217 Stephen Wolbers, The RUN91 Subsplits ; June 7, 1994

153. AN221 Stephen Wolbers, Final E665 Datasets – RUN87, RUN90, RUN91 ; September 2, 1994

154. AN224 Stephen Wolbers, J/Psi Events in E665 ; February 15, 1995

155. SW222 Stephen Wolbers, Porting e665 code to OSF1 ; April 17, 1995

156. SW223 Stephen Wolbers, The RUN91 Hadron Subsplit ; April 25, 1995

157. SW226 Stephen Wolbers, Porting E665 code to OSF1, part 2 – E665 reconstruction package ; June 2, 1995

158. Performance of UltraSparc ; Stephen Wolbers ; January 14, 1996

159. The Fermilab Farms in 1995 ; Stephen Wolbers ; January 16, 1996

160. AN227 The E665 Energy Scale ; Stephen Wolbers ; September 13, 1996

**BC72/73**

1. 'Pair Spectrometer Foil E & M Physics' J. Kent and S. Wolbers, BC 72/73 note 110, (1980).

2. 'Preliminary FVGP Results' S. Wolbers and G. Yost, BC 72/73 note 255, (1982).

3. 'Geometric Reconstruction of Very Short Tracks' G. Yost and S. Wolbers, BC 72/73 note 273, (1982).

4. 'Software Chain using FVGP and Bigsquaw' S. Wolbers, BC 72/73 note 283, (1982).

5. 'Event 2693-360' S. Wolbers, BC 72/73 charm candidate note W-22, (1982).

6. 'Event 2301-098' S. Wolbers, BC 72/73 charm candidate note W-23, (1982).

7. 'FVGP Charm DST' S. Wolbers, BC 72/73 note 313, (1983).

8. 'SLAC Zoo Events' S. Wolbers, BC 72/73 note 314, (1983).

9. 'Bigsquaw Fits of Charm Decays' S. Wolbers, BC 72/73 note 317, (1983).

10. ‘Inclusive Photoproduction of $\Lambda$ and $\overline{\Lambda}$ at 20 GeV’ S. Wolbers *et al.*, Bull. Am. Phys. Soc. **29**, 652, (1984) and ‘Transparancies of talk at Washington APS Meeting’ S. Wolbers, BC 72/73 note 347, (1984).

11. ‘Determination of the Coefficients in the Quark-Diquark Fusion Model’ S. Wolbers, BC 72/73 note 348, (1984).

12. ‘Measurement of the Number of $K_s^0$ with $p > 10$ GeV/c’ S. Wolbers, BC 75 note 52, (1984).

13. ’Quark-Diquark Fusion and $\Lambda_c$ Photoproduction’ S. Wolbers, BC 75 note 53, (1984).

14. ‘Inclusive Photoproduction of Strange Baryons at 20 GeV’, S. Wolbers, (thesis) U.C. Berkeley, 1984.

15. ‘Complete Description of Scanlib–the Berkeley Scanning Software’, S. Wolbers, (1981).

16. ‘Scanlib Documentation–Putting Scan Sheets Into the Computer (manual)’, S. Wolbers, (1981).

17. ‘Small Modifications of the Scan Rules’, S. Wolbers, (1982).

18. ‘BC73 Charm Candidate Measuring Rules’, S. Wolbers, G. Yost, (May, 1982).

19. ‘Addendum to the Scanning Rules Regarding Charm Candidates’ S. Wolbers, G. Yost, D. Chapman (August, 1982).

20. ‘Berkeley Measuring Rules for SLAC Experiment BC72/73’ S. Wolbers, G. Yost, D. Chapman (September, 1982).

21. ‘Berkeley Charm Scanning and Measuring’ S. Wolbers, (December, 1982).

22. ‘Addendum to Scanning Rules # 2’ S. Wolbers, (January, 1983).

23. ‘BC75 Scanning Rules’ S. Wolbers, (April, 1983).

24. 'Scanning and Measuring the Test Run ($\geq$ roll 7000)' S. Wolbers, G. Yost, H.H. Bingham (November, 1983).

25. 'BC75 Triple Scanning' S. Wolbers, (May, 1984).

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