

CURRICULUM VITAE FOR KEITH RUDDICK

Born: December 2, 1939; Haltwhistle, Northumberland, England.

Citizenship: British

Education:

B.Sc., Birmingham University, England, 1961.

Ph.D., Birmingham University, England, 1964.

Positions held:

Research Associate, University of Michigan, 1964-66.

Assistant Professor, University of Minnesota, 1966-70.

Associate Professor, University of Minnesota, 1970-75.

Professor, University of Minnesota, 1975-present.

Societies:

Graduate of the Institute of Physics.

Member of the American Physical Society.

PUBLICATIONS IN REFEREED JOURNALS:

1. The production of He^4 in deuteron interactions at 650 MeV.
(with K. R. Chapman et al., 9 auth.) Nuc. Phys. 57, 499 (1964)
2. Observation of the reaction $d + d \rightarrow \text{He}^4 + 2\pi$ at 1.69 GeV/c.
(with K. R. Chapman et al., 9 auth.) Phys. Lett. 21, 465 (1966)
3. Structure in $\pi^- p$ elastic scattering at 180° .
(with S. W. Kormanyos et al., 5 auth.) Phys. Rev. Lett. 16, 512, (1966)
4. Attenuation cross-sections for 650 MeV deuterons.
(with J. D. Jafar et al., 6 auth.) Nuovo Cimento 48, 165 (1967)
5. Measurement of $\pi^- p$ elastic scattering at 180° .
(with S. W. Kormanyos et al., 5 auth.) Phys. Rev. 164, 1661 (1967)
6. Proton-proton elastic scattering at 90° and structure within the proton.
(with C. W. Akerlof et al., 6 auth.) Phys. Rev. Lett. 17, 526 (1967)
7. Elastic proton-proton scattering at 90° and structure within the proton.
(with C. W. Akerlof et al., 6 auth.) Phys. Rev. 159, 1138 (1967)
8. Measurement of $pp \rightarrow \pi^+ d$ at 90° .
(with L. G. Ratner et al., 6 auth.) Phys. Rev. 165, 1442 (1968)
9. $\pi^- p$ charge exchange at high momentum transfer.
(with R. C. Chase et al., 7 auth.) Phys. Rev. Lett. 22, 1137 (1969)
10. Observation of backward η production.

- (with R. C. Chase et al., 7 auth.) Phys. Lett. 30B, 659 (1969)
11. Observation of "peripheral" backward multipion production.
(with D. Cline et al., 8 auth.) Phys. Rev. Lett. 23, 491 (1969)
 12. A Measurement of the analyzing power of aluminium for 490 MeV protons.
(with J. D. Dowell et al., 5 auth.) Lett. Nuovo Cim. 3, 614 (1970)
 13. Pion and proton charge exchange at backward angles. (with R. C. Chase et al., 7 auth.) Phys. Rev. D2, 2588(1970)
 14. The reaction $\pi^-p \rightarrow \gamma\gamma n$ at 3.65 GeV/c.
(with E. H. Harvey et al., 7 auth.) Phys. Rev. Lett. 27, 885 (1971)
 15. Measurement of asymmetries of inclusive pion production in proton-proton interactions at 6 and 11.8 GeV/c.
(with R. D. Klem et al., 9 auth.) Phys. Rev. Lett. 36, 929 (1976)
 16. Polarization in pp elastic scattering at small t.
(with R. D. Klem et al., 9 auth.) Phys. Rev. D15, 602 (1977)
 17. Polarization in p- He^4 scattering at 0.56,0.80,1.03,1.27, and 1.73 GeV/c.
(with G. Igo et al., 14 auth.) Phys. Rev. Lett. 38, 1272 (1977)
 18. ϕ production in π^-p collisions near threshold.
(with H. Courant et al., 6 auth.) Phys. Rev. D16, 1 (1977)
 19. Differential cross-sections for p- He^4 elastic scattering at GeV energies.
(with R. Klem et al., 14 auth.) Phys. Lett 70B, 155 (1977)
 20. Measurement of the energy dependence of elastic πp and pp scattering at large angles.
(with K. A. Jenkins et al., 10 auth.) Phys. Rev. Lett. 40, 425 (1978)
 21. Fluctuations in large angle πp elastic scattering.
(with K. A. Jenkins et al., 10 auth.) Phys. Rev. Lett. 40, 429 (1978)
 22. Search for the reaction $\pi^-p \rightarrow \psi n$ near threshold.
(with K. Jenkins et al., 12 auth.) Phys. Rev. D17, 52 (1978)
 23. Search for direct electron production in p-p and p-Be collisions at 12 GeV/c.
(with Y. Makdisi et al., 8 auth.) Phys. Rev. Lett. 41, 367 (1978)
 24. Polarization in elastic p-p and p-n scattering at 1.03 GeV/c.
(with M. L. Marshak et al., 9 auth.) Phys. Rev. C18, 331 (1978)
 25. Analyzing power in the reactions $pd \rightarrow dp$ and $pp \rightarrow d\pi^+$ at GeV energies.
(with E. Biegert et al., 13 auth.) Phys. Rev. Lett. 41, 1098 (1978)
 26. Asymmetries in inclusive proton-nucleon scattering at 11.75 GeV/c.
(with W. H. Dragoset et al., 9 auth.) Phys. Rev. D18, 3939 (1978)
 27. Cross-sections and polarization measurements of p-He elastic scattering at GeV energies.
(with H. Courant et al., 14 auth.) Phys. Rev. C19, 104 (1979)
 28. Tensor analyzing power in pd backward scattering at GeV energies.
(with G. Igo et al., 13 auth.) Phys. Rev. Lett. 43, 425 (1979)
 29. Elastic scattering of 2 GeV polarized deuterons from hydrogen.
(with G. Igo et al., 14 auth.) Phys. Lett. 87B, 198 (1979)
 30. Radiative width of the ρ meson.
(with D. Berg et al., 21 auth.) Phys. Rev. Lett. 44, 706, (1980)
 31. Depolarization parameter in pp inclusive scattering at 6 GeV.
(with H. Courant et al., 11 auth.) Phys. Rev. Lett. 44, 1373 (1980)
 32. Measurement of wide-angle elastic scattering of pions and protons off protons.
(with K. Jenkins et al., 8 auth.) Phys. Rev. D21, 2445 (1980)
 33. Analyzing power in large angle proton-neutron elastic scattering.
(with Y. Makdisi et a., 17 auth.) Phys. Rev. Lett. 45, 1529 (1980)

34. Radiative decay of the $K^*(890)$.
(with D. Berg et al., 22 auth.) Phys. Lett. 98B, 18 (1981)
35. Enhanced 200GeV/c K beam using beryllium filter.
(with A. Jonckheere et al., 19 auth.) Nuc. Inst. Meth. 180, 25 (1981)
36. Evidence for non-eikonal effects in the tensor and vector analysing powers in pd elastic scattering at 800 MeV.
(with M. Bleszynski et al., 15 auth.) Phys. Lett. 106B, 42, (1981)
37. Radiative width of the A2.
(with S. Cihangir et al., 20 auth.) Phys. Lett. 117B, 119 (1982)
38. Radiative width of the $K^*(1430)$.
(with S. Cihangir et al., 20 auth.) Phys. Lett. 117B, 123 (1982)
39. Radiative decay width of the rho meson.
(with T. Jensen et al., 23 auth.) Phys. Rev. 27, 26 (1983)
40. Calibration and performance of a drift chamber spectrometer.
(with C. Chandlee et al., 20 auth.) Nuc. Inst. Meth. 215, 369 (1983)
41. Operational performance of a large liquid argon calorimeter.
(with C. Nelson et al., 20 auth.) Nuc. Inst. Meth. 216, 381 (1983)
42. Results from a new search for proton decay.
(with J. Bartelt et al., 13 auth.) Phys. Rev. Lett. 50, 651 (1983)
43. New limit on magnetic monopole flux.
(with J. Bartelt et al., 13 auth.) Phys. Rev. Lett. 50, 655 (1983)
44. Nuclear enhancement of π and η mesons produced at large transverse momenta.
(with J. Povlis et al., 28 auth.) Phys. Rev. Lett. 51, 967 (1983)
45. Inclusive production of direct photons in 200 GeV/c collisions.
(with M. McLaughlin et al., 28 auth.) Phys. Rev. Lett. 51, 971 (1983)
46. Three pion production on nuclei at 200 GeV.
(with M. Zielinski et al., 18 auth.) Zeit. Phys. C16, 197 (1983)
47. Elastic pion compton scattering.
(with R. Kowaleski et al., 21 auth.) Phys. Rev. D29, 1000 (1984)
48. Evidence for the electromagnetic production of the A1.
(with M. Zielinski et al., 18 auth.) Phys. Rev. Lett. 52, 1195 (1984)
49. Elastic π compton scattering.
(with M. Zielinski et al., 21 auth.) Phys. Rev. D29, 2633 (1984)
50. Production of low-mass $K\omega$ systems on nuclei.
(with M. Zielinski et al., 18 auth.) Phys. Rev. D30, 1107 (1984)
51. Partial wave analysis of coherent 3π production on nuclei at 200 GeV.
(with M. Zielinski et al., 18 auth.) Phys. Rev. D30, 1855 (1984)
52. Primakoff production of the B(1235) meson.
(with B. Collick et al., 18 auth.) Phys. Rev. Lett. 53, 2374, (1984)
53. Evidence for time and directional enhancements of multimMuon cosmic ray events.
(with J. Bartelt et al., 14 auth.) Phys. Rev. 32D, 1630 (1985)
54. Evidence for muon production by particles from Cygnus X-3.
(with M. Marshak et al.) Phys. Rev. Lett. 54, 2079 (1985)
55. A large liquid argon photon/hadron calorimeter for FNAL.
(with F. Lobkowitz et al.) Nuc. Inst. Meth. A235, 332 (1985)
56. Model for underground muons associated with Cygnus X-3.
Phys. Rev. Lett. 57, 531 (1986)
57. Measurement of the resonance parameters and radiative width of the ρ^+ .

- (with J. Huston et al.) Phys. Rev. D33, 3199 (1986)
58. A silicon microstrip detector for direct photon physics.
(with E. Engels et al., 57 auth.) Nuc. Inst. Meth. A253, 523 (1987)
59. Tensor and vector spin observables in p-d elastic scattering at 600, 800, and 1000 MeV.
(with M. Haji-Saied et al., 18 auth.) Phys. Rev. C36, 2010 (1987).
60. Monopole flux and proton decay limits from the Soudan 1 detector.
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61. Performance characteristics and radiation damage results from the Fermilab E706 silicon microstrip detector system.
(with E. Engels et al., 53 auth.) Nuc. Inst. Meth. A279,272(1989)
62. Test results from a high-resolution proportional chamber with interpolative pad readout.
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63. High-resolution proportional chamber with interpolative pad readout.
(with A.L.S.Angelis et al., 17 auth) Nuc. Phys. B16,504 (1990)
64. Study of muons from the direction of Cygnus X-3 using an underground proportional array.
(with J. Kochocki et al.) Phys. Rev. 42D,2967(1990)
65. Observations of muons from the direction of Cygnus X-3 during the January 1991 Radio Flare.
(with M.A.Thomson et al.) Phys. Lett. 13,269(1991)
66. Coincidences between extensive air showers and the Soudan 1 underground muon detector.
(with U. DasGupta et al.) Phys. Rev. D45,1459(1992)
67. Direct photon production at high P_t in π^- -Be and p-Be collisions at 500 GeV/c
(with G.Alverson et al.) Phys. Rev. Lett. 68,2584(1992)
68. Pi-zero production at high P_t in π^- -Be and p-Be collisions at 500 GeV/c
(with G.Alverson et al.) Phys. Rev. D45,3899(1992)
69. Structure of the recoiling system in direct photon and pi-zero production by pi-minus and proton beams at 500 GeV/c
(with G.Alverson et al.) Phys. Rev. D49,3106(1994)
70. Determination of the half-life of ^{212}Po .
(sole author, Am. Jour. Phys. 63,658(1995)
71. Two neutrino double-beta decay of ^{100}Mo to the first excited 0^+ state in ^{100}Ru .
(with A.S.Barabash et al.) Phys. Lett. B345,408(1995)
72. Ultra high energy cosmic ray composition from surface air shower and underground muon measurements at Soudan.
(with N.Longley et al.) Phys.Rev D52,2760(1995)
73. The Soudan 2 detector: the design and construction of the tracking calorimeter modules.
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74. The Soudan 2 detector: the operation and performance of the tracking calorimeter modules.
(with W.W.M. Allison et al.) Nuc. Inst Meth.,A381,385(1996)
75. Elemental Composition of cosmic rays using a maximum likelihood method
(sole author, Nuc. Phys. Proc. Suppl.,48,441(1996)
76. A study of cosmic ray composition in the knee region using multiple muon events in Soudan 2.
(with S.Kasahara et al.) Phys.Rev. D55,5282(1997)
77. Measurement of the atmospheric neutrino flavour composition in Soudan 2.
(with W.W.M. Allison et al.) Phys. Lett. B391,491(1997)
78. Search for the proton decay mode $p \rightarrow \nu K^+$ in Soudan 2.
(with W.W.M. Allison et al.) Phys. Rev. D58 (1998)
79. The atmospheric neutrino flavor ratio from a 3.9 fiducial kiloton year exposure of Soudan 2.
(with W.W.M. Allison et al.) Phys. Lett. B449,137(1999)

80. An accurate measurement of g using falling balls.
(With Kurt Wick) Am. J. Phys. 67(11),962,(1999)
81. CHESSE: a rapid Cherenkov and electromagnetic shower simulator.
(with V.Vassilev et al.), Astroparticle Ph. 13,87(2000)
82. Search for the proton decay mode to neutrino K^+ in Soudan 2
(with D.Wall et al.) Phys. Rev D61,8 (2000)
83. Search for nucleon decay with final states lepton-eta, antineutrino-eta, and antineutrino-eta using Soudan 2.
(with D.Wall et al.) Phys Rev D62:092003(2000)
83. A comprehensive characterization of Hamamatsu 16- and 64-anode PMTs
(with K. Lang et al.) Nuc. Inst. and Meth. A461:571(2001)
84. A large liquid scintillator detector for a long baseline neutrino experiment
(with P. Porder et al.) Nuc. Inst and Meth. A463:194(2001)