

THE UNIVERSITY OF CONNECTICUT

Biography, Bibliography and Professional Summary
of
George H. Rawitscher, Professor Emeritus, Department of Physics

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BIRTHDATE: 2/27/28 Birthplace: Freiburg, Germany
(U.S. Citizen, 1971)

EDUCATION: B.A. 1949 Sao Paulo, Brazil
Ph.D. 1956 Stanford University

EXPERIENCE: 1950-52 Instructor, Centro Brasileiro de Pesquisas Fisicas,
Rio de Janeiro
1953-56 Research and Teaching Assistant, Stanford University
1956-58 Instructor, University of Rochester
1958-64 Instructor, Yale University; Assistant Professor, 1961-64
1964 Associate Professor, University of Connecticut;
Professor, 1972-2009.
1964-66 Academic Leave, Max Planck Institut fur Kernphysik,
Heidleberg, Germany
1972-73 Academic Leave, Visiting Scientist, Laboratory for
Nuclear Science, Massachusetts Institute of Technology
(September-December, 1972); Guest Professor, Physics
Department, University of Surrey, England (January-
August, 1973)
1987-88 Sabbatic Leave, Nuclear Theory Group, University of
Maryland
1995 Sabbatic Leave, Sept.-Dec., University of Connecticut
2002 Sabbatic Leave, Sept.-Dec., University of Connecticut
2009 Emeritus, Univ. of Connecticut
2009-13 Research Professor in Physics, University of Connecticut

PROFESSIONAL SOCIETIES: American Physical Society; American Association of
University Professors; Sigma Xi

On the Board of Directors from approximately 1982 to
1985 of the Bates Users Theory Group.

1993-1995, Member at Large of the executive committee
committee of the APS topical group "Few Body Systems and
Multi-Particle Dynamics.

HONORS OR DISTINCTIONS: Awards, Fellowships: Brazilian National Research Council Fellowship, 1952-55; Alexander V. Humboldt German Research Fellowship, 1964-66; elected Fellow of the American Physical Society in 2016.

SUMMER APPOINTMENTS: Radiation Laboratory, Berkeley, California, 1964; University of Oxford, England, 1966; Brookhaven National Laboratory, 1967; DSR Research Staff Member, Laboratory for Nuclear Science, Massachusetts Institute of Technology, 1969; Argonne National Laboratory, 1970 (2 weeks); Physics Department, Stanford University, California, 1971; Center for Theoretical Physics, Massachusetts Institute of Technology, 1975

INVITED TALKS PRESENTED AT MEETINGS: Third Conference on Reactions Between Complex Nuclei, Asilomar, California, 1963; Massachusetts Institute of Technology Summer Study of "Medium Energy Nuclear Physics with Electron Linear Accelerators", 1967; Symposium on Heavy Ion Scattering Argonne National Laboratory, 1971; "how Local is the Optical Potential?", talk given Sept. 1986 at the Drexel Workshop on Relations between Structure and Reactions in Nuclear Physics; "Channel coupling nonlocality and the Optical Model", talk given May 1987 in the Trieste 3rd Workshop on Perspectives in Nuclear Physics at Intermediate Energies; "Separable Representation of the two-body Reid Soft Core T-operator in terms of Positive Energy Weinberg States", talk given August 1988 in Kalinin at the International Seminar on Microscopic Methods in Few Body Systems; "What are Sturmians", talk given at the 1995 Joint April Meeting of the APS and AAPT in Washington, DC.

FIELD OF SPECIALIZATION: Theoretical Nuclear and Atomic Physics

RESEARCH INTERESTS: Scattering problems which involve non-local optical potentials, reaction mechanisms involving break-up and virtual nuclear excitations, the solution of coupled equations, numerical Galerkin and spectral methods, separable representations of scattering T-matrices, sturmian functions, numerical solution of integral equations, three-body Faddeev equations.

PUBLICATIONS:

Conference Proceedings

- McIntosh, J. S., S. C. Park and G. H. Rawitscher. 1960. Small angle elastic scattering of heavy nuclei, Gatlinburg, Tennessee. Proc. 2nd Conf. on Reactions Between Complex Nuclei, A. Zucker, F. T. Howard and E. C. Halbert, Eds. John Wiley and Sons, Inc., New York. pp. 127-37.
- Rawitscher, G. H., J. S. McIntosh and J. A. Polak. 1963. Heavy ion elastic scattering. Proc. 3rd Conf. on Reactions Between Complex Nuclei, Asilomar, California. University of California Press, Berkeley. pp. 3-9.
- Rawitscher, G. H. and W. R. Smith. 1966. Effect of stripping channels on the elastic scattering of deuterons. Proc. Int. Nucl. Phys. Conf., R. L. Becker, Ed. (Academic Press, 1967) pp. 104-07.
- Rawitscher, G. H. 1967. Dispersion corrections to elastic electron scattering. MIT 1967 Study on Medium Nuclear Physics with Electron Linear Accelerators. TID-24667. pp. 167-80.
- Rawitscher, G. H. 1971. Coupled channel calculations of elastic heavy ion scattering. Proc. Symp. on Heavy Ion Scattering. Argonne Nat. Lab. ANL-783-37. pp. 199-228. (March).
- Rawitscher, G. H. 1973. Effect of breakup on deuteron nucleus scattering. Proc. Int. Conf. on Nucl. Phys. Conf., J. de Boer and H. J. Mang, Eds. Munich. North Holland, 1973) p. 401.
- Rawitscher, G. H. 1977. What can one learn from (ee') experiments on polarized targets. Proc. of the 1977 Bates Linac Summer Study, MIT, Report COO-3096-677 edited by A. Bernstein, unpublished.
- Rawitscher, G. H. and S. N. Mukherjee. 1978. Proc. INS International Symp. on Nuclear Direct Reaction Mechanisms, Fukuoka, Japan 1978, edited by M. Tanifuji and K. Yazaki, p. 236.
- Rawitscher, G. H. and G. Delic. 1983. Proc. RCNP International symposium on Light-Ion Reaction Mechanisms, held at Ooka, Japan, May 15-19. Edited by H. Ogata et al.
- Rawitscher, G. H. 1984. Workshop held at Glouster, Ohio, on Neutron-Nucleus Collisions--a Probe of Nuclear Structure, AIP Conference Proc. No. 124, Edited by J. Rapaport, R. W. Finlay, S. M. Grimes and F. S. Dietrich, (New York, 1985), p. 135.
- Rawitscher, G. H. 1985. Proc. International Symposium held at Bad Honnef, June 18-21. Published in Lecture Notes in Physics 243, ed. by H. V. von Geramb. The equivalent local potential for the case of Channel coupling by means of the inverse scattering method, by G. R. Rawitscher, R. H. Fiedeldey, S. A. Sofianos and d. D. Wang, pp. 207-219.
- Rawitscher, G.H. 1987. Proc. Drexel Workshop on Relations between Nuclear Structure and Nuclear Reactions in Nuclear Phys., ed. by D. Feng, M. Vallieres and B. Wildenthal (World Scientific, 1987), p. 348.
- Rawitscher, G.H. 1988. Proc. 3rd Workshop on Perspectives in Nuclear Physics at Intermediate Energies, ed. by S. Boffi, C. degli Atti and M. Giannini. (World Scientific Publ. Co., Singapore 1988) p. 329-337.
- Rawitscher, G.H. 1989. Proc. Symposium of the 40th Anniversary of the Nuclear Shell Model, ed. by T.-S.H. Lee and R.B. Wiringa, ANL/PHY-89/1 p. 81-88.

Rawitscher, G.H., I. Koltracht, R.A. Gonzales. 1998. Solution of the Lippmann-Schwinger equation in configuration space by a Chebyshev expansion method. Proc. XVII RCNP International Symposium on Innovative Computational Methods in Nuclear Many-Body Problems, ed. by H. Horiuchi, M. Kamimura, H. Toki, Y. Fujiwara, M. Matsuo, and Y. Sakuragi. (World Scientific Publ. Co., Singapore 1998) p. 188-195.

Rawitscher, G.H., and I. Koltracht. 2003. A Spectral Integral Method for the Solution of the Faddeev Equations in Configuration Space. Proc of the 17th International IUPAP conference on Few Body Problems in Physics. Nuclear Phys. A 737CF, S314-S316 (2004).

Rawitscher, G. H. and I. Koltracht, "Can the CDCC be improved? A proposal" Proceedings of the NUSTAR05 Conference, J. of Phys. G: Nuclear and Particle Physics, 31, # 10 S1589-S1592 (2005).

Gloeckle, W and G. Rawitscher, "Scheme for an accurate solution of Faddeevv integral equations in configuration space", Proceedings of the 18th International Conference on Few-Body Problems in Physics, Aug 21-26, 2006, Santos, Brazil, Nucl. Phys. A, 790, 282-285 (2007)

Rawitscher, G and W. Gloeckle, "Calculation of the Two-Body scattering T matrix in configuration space", Proceedings of the 20th European Conference on Few-Body Problems in Physics, Pisa, Italy, 10-14 September 2007, Few-Body Syst 44, 245-247 (2008)

Rawitscher, G and W. Gloeckle, "Steps for the Solution of Faddeev Integral Eqs. in Configuration Space", Proceedings of the conference of the 19th International Conference on Few-Body Problems in Physics, held at the University of Bonn 8-20-2009 to 9-5-2009, EPJ Web of Conferences 3, 05012, pp 1-7 (2010).

Rawitscher, G. and W. Gloeckle, "Progress in the Numerical Solution of Continuum Faddeev Integral Equations in Configuration Space", Few Body Systems on line, DOI 10.1007/s00601-010-0146-0, Proceedings of the 21st European Conference on Few-Body Problems in Physics, held 30 Aug. to 3 Sept. 2011 in Salamanca, Spain. Few-Body Syst. 50, 239-242 (2011)

Journal Articles (86)

1 Rawitscher, G. H. 1956. Effect of the finite size of the nucleus on μ -pair production by gamma rays. Phys. Rev. 101:423-26.

2 Rawitscher, G. H. 1957. Pair creation cross section of spin 1/2 particles possessing an anomalous magnetic moment. Phys. Rev. 107:274-76.

3 Rawitscher, G. H. 1958. Scattering of polarized μ -mesons from extended nuclei. Phys. Rev. 112:1274-81.

4 Rawitscher, G. H. 1961. Scattering of μ -mesons from the nuclei of bromine and silver. Phys. Rev. 124:1978-81.

5 Rawitscher, G. H. and C. R. Fisher. 1961. Comparison of the scattering of positrons and electrons from nuclear charge distributions. Phys. Rev. 122:1330-37.

- 6** Rawitscher, G. H. 1964. Non-relativistic limit of Coulomb scattering. Phys. Letts. 9:337-39. Phys. Rev. 135:B605-12.
- 7** Fischer, C. R. and G. H. Rawitscher. 1964. Electron and muon scattering from nuclear charge distributions at incident momentua between 50 and 183 MeV/c. Phys. Rev. 135:B377-83.
- 8** Rawitscher, G. H. 1964 Approximate Independence of Optical Model Elastic Scattering calculations o the Potential at small distances. Phys. Rev. 135: B605-B612
- 9** McIntosh, J. S., S. C. Park and G. H. Rawitscher. 1964. Nucleus-nucleus long range potential in elastic scattering. Phy. Rev. 134:B1010.
- 10** Rawitscher, G. H. 1965. Ingoing wave boundary condition analysis on α -Ni elastic scattering. Phys. Rev. Letts. 14:150.
- 11** Rawitscher, G. H. 1966. Effect of stripping channels on the elastic scattering of deuterons. Phys. Letts. 21:444.
- 12** Rawitscher, G. H. 1966. Parabolic potential barrier model as an approximation to optical model calculations. Nucl. Phys. 83:239.
- 13** Rawitscher, G. H. 1966. Ingoing wave boundary condition analysis of Alpha and and Deuteron elastic scattering cross sections. Nucl. Phys. 85:337.
- 14** Rawitscher. G. H. 1966. Monopole excitation correction to electron elastic scattering. Phys. Rev. 151:864.
- 15** Rawitscher, G. H. 1967. Effect of stripping channels upon the elastic scattering of deuterons for the nucleus of calcium. Phys. Rev. 163:1223-38.
- 16** Rawitscher, G. H. 1968. Energy dependence of the deuteron optical model potential. Phys. Rev. Letts. 20:673.
- 17** van Niftrik, G.J.C., G.A. Peterson and G.H. Rawitscher. 1969. Effect of an assumed proton charge halo on the elastic scattering of electrons from nuclei. Phys. Rev. 177:1797.
- 18** Rawitscher, G. H. and S. N. Mukherjee. 1969. Stripping cross section calculations; comparison between a couple channel method and the DWBA for ^{40}Ca . Phys. Rev. 181:1518.
- 19** Rawitscher, G. H. 1970. Virtual nuclear excitation corrections to elastic electron scattering at low energies. Phys. Letts. 33B:445.
- 20** Uginčius, P., H. Uberall and G. H. Rawitscher. 1970. Nuclear size effects in the polarization of elastically scattered electrons. Nucl. Phys. A158:418-32.
- 21** Rawitscher, G. H. and S. N. Mukherjee. 1971. Spin dependent deuteron-nucleus interaction caused by coupling to stripping channels. Ann. Phys. 68:57-93.

- 22** Rawitscher, G. H. and R. A. Spicuzza. 1971. Relation between nuclear matter and nuclear potential in inelastic α -nucleus scattering. Phys. Letts. 37B:221.
- 23** Rawitscher, G. H. 1972. Estimate of the α -nucleus spin-orbit potential. Phys. Rev. C6:1212.
- 24** Glanz, P. K. and G. H. Rawitscher. 1973. Magnetic substate population cross sections in inelastic α -nucleus scattering. Nucl. Phys. A217:299.
- 25** Rawitscher, G. H. 1974. Effect of deuteron break up on elastic deuteron-nucleus scattering. Phys. Rev. C9:2210-29.
- 26** Rawitscher, G. H. 1975. Effect of deuteron break up on (d,p) cross sections, Phys. Rev. C11:1152-58.
- 27** Rawitscher, G. H. 1975. Johnson and Soper's method of including deuteron break up for the calculation of stripping cross section. Nucl. Phys. A241:365-85.
- 28** Rasmussen, C. H. and G. H. Rawitscher. 1976. Asymptotic approximations, with error estimates, of the scattering matrix for quantal coulomb excitation by means of a non linear (Riccati) matrix differential equation. J. of Math. Phys. 18:395-403.
- 29** Rawitscher, G. H. and C. H. Rasmussen. 1976. Error analysis of code AROSA for quantal coulomb excitation calculations. Comp. Phys. Comm. 11:183-98.
- 30** Rawitscher, G. H. and S. N. Mukherjee. 1978. Effect of break up on the spin dependence of the deuteron-nucleus interaction. Phys. Rev. Lett. 40:1486.
- 31** Rawitscher, G. H. and S. N. Mukherjee. 1979. Effect of break up on the deuteron-nucleus spin orbit and tensor potentials. Ann of Phys. (N.Y.) 123:330-58.
- 32** Rawitscher, G.H. and S.N. Mukherjee. 1980. Second order break up correction to elastic deuteron nickel scattering between 13 and 80 MeV. Nucl. Phys. A342:90-110.
- 33** Rawitscher, G. H. and W. Zickendraht. 1981. Formulation in terms of hyperspherical harmonics of the effect of break up in deuteron-nucleus collisions. Phys. Rev. C23:623-32.
- 34** Zickendraht, W. and G. H. Rawitscher. 1981. Break up coupling potentials for deuteron-nucleus collisions in the space of hyperspherical harmonics. Phys. Rev. C23:633-44.
- 35** Rawitscher, G. H. 1982. Positive energy Weinberg states for the solution of scattering problems. Phys. Rev. C25:2196-2213.
- 36** Rawitscher, G. H. and S. N. Mukherjee. 1982. Effect of deuteron break up on the $^{24}\text{Mg}(p,d)^{23}\text{Mg}$. ($1/2^+$, 2.36MeV) Cross Section near 100 MeV. Phys. Lett. 110B:189-192.
- 37** Rawitscher, G. H. and R. Y. Rasoanaivo. 1983. Sensitivity of the elastic scattering matrix elements to the range of the inelastic potentials. Phys. Rev. C27:1078-1082.

- 38** Rawitscher, G. H. and G. Delic. 1984. Solution of the scattering T-matrix equation in discrete complex momentum space. Phys. Rev. C29, 747-754.
- 39** Rawitscher, G. H. and G. Delic. 1984. Sturmian representation of the optical model potential due to coupling to inelastic channels. Phys. C29, 1153-1162.
- 40** Delic, G. and G. H. Rawitscher. 1985. Sturmian eigenvalue equations with a Chebyshev polynomial basis. Journal of Comput'l Phys. 57, 188-209.
- 41** Rawitscher, G. H. 1985. Interpretation of the Perey-Buck nonlocality in terms of the relativistic optical model formalism. Phys. Rev. C31, 1173-1178.
- 42** Rawitscher, G. H. and G. Delic. 1986. Sturmian eigenvalue equations with a Bessel function basis. J. of Math. Phys. 27:816-823.
- 43** Rawitscher, G. H. 1986. Importance of third-and higher order virtual nuclear excitation contribution to the nucleon-nucleus interaction. Phys. Rev. C33, 1535-1538.
- 44** Rawitscher, G.H. and E.S. Hirschorn. 1987. Accurate Evaluation of an integral involving the product of two Bessel functions and a Gaussian. J. Comp. Phys. 68:104-126.
- 45** Austern, N., Y. Iseri, M. Kammimura, M. Kawai, G. Rawitscher and M. Yahiro. 1987. Continuum-Discretized coupled-channels calculations for three body models of deuteron-nucleus reactions. Phys. Rep. 154, 125-204.
- 46** Rawitscher, G.H. 1987. The microscopic Feshbach optical potential for a schematic coupled channels example. Nucl. Phys. A475, 519-547.
- 47** Rawitscher, G.H. 1989. Separable representation of the two-body Reid soft core T-operator in terms of positive energy weinberg states. Phys. Rev. C39, 440-451.
- 48** Rasoanaivo, R.Y. and G.H. Rawitscher. 1989. Discretization methods of the breakup continuum in deuteron-nucleus collisions. Phys. Rev. C39, 1709-1720.
- 49** Canton, L., Pisent, G. and G.H. Rawitscher. 1990. W-matrix method for the representation of the scattering T-matrix: analytical example. Phys. Rev. C41, 427-434.
- 50** Canton, L. and G.H. Rawitscher. 1991. Sensitivity of the T-matrix to defects in the potential. J. of Phys. G: Nuclear and Particle Physics 17, 429-438.
- 51** Rawitscher, G.H. 1991. Accuracy analysis of a Bessel spectral function method for the solution of scattering equations. Journal of Computational Physics 94, 81-101.
- 52** Rawitscher, G.H. and L. Canton. 1991. Numerical quasiparticle representation of the nucleon-nucleon T-matrix. Phys. Rev. C44, 60-66.

- 53** Fiedeldey, H., R. Lipperheide, G.H. Rawitscher and S.A. Sofianos. 1992. Equivalent Local potentials for energy dependent nonlocal interactions. Phys. Rev. C45, 2885-2890.
- 54** Canton, L., G. Cattapan, G. Pisent and G.H. Rawitscher. 1993. Singular-value decomposition of the nucleon-nucleon reactance matrix. Il Nuovo Cimento, 106A, 71-77.
- 55** Rawitscher, G.H., D. Lukaszek, R.S. Mackintosh, and S.G. Cooper. 1994. Local representation of the exchange nonlocality in n-¹⁶O scattering. Phys. Rev. C49, 1621-1629.
- 56** Lukaszek, D. and G.H. Rawitscher. 1994. Does exchange produce L-dependence in the optical model potential? Phys. Rev. C50, 968-978.
- 57** Rawitscher, G.H., I. Koltracht, Hong Dai and C. Ribetti. 1996. The vibrating string, a fertile topic for teaching scientific computing. Comp. in Phys., 10, 335-340.
- 58** Lukaszek, D. and G.H. Rawitscher. 1996. Local approximation to the exchange non-locality for neutron-¹⁶O scattering. Phys. Rev. C54, 805-808.
- 59** Gonzales, R.A., J. Eisert, I. Koltracht, M. Newmann, and G. Rawitscher. 1997. Integral Equation Method for the Continuous Spectrum Radial Schrödinger Equation. J. of Comput. Phys. 134:134-149.
- 60** Rawitscher, G.H. 1997. Inclusion of virtual nuclear excitations in the formulation of the (e,e'N) reaction. Phys. Rev. C56, 2029-2040.
- 61** R. A. Gonzales, S. -Y. Kang, I. Koltracht, and G. Rawitscher: 1999. Integral Equation Method for Coupled Schroedinger Equations, J. of Comput. Phys. 153, 160-202
- 62** G. H. Rawitscher, B. D. Esry, E. Tiesinga, J. P. Burke, Jr., and I. Koltracht. 1999 Comparison of Numerical Methods for the Calculation of Cold Atom Collisions, J. of Chem. Phys., 111, 10418-104226.
- 63** G. H. Rawitscher, C. Merow, M. Nguyen, and I. Simbotin. 2002 Resonances and Quantum Scattering for the Morse Potential as a Barrier. Am. J. Phys., 70, 935-944,
- 64** S. Y. Kang, I. Koltracht, and G. H. Rawitscher. Nystrom-Clenshaw-Curtis quadrature for Integral Equations with Discontinuous Kernels. 2003 Math. Comp., 72, 729-756,.
- 65** Rawitscher, G.H., S.Y. Kang, and I. Koltracht. 2003 A novel method for the solution of the Schroedinger equation in the presence of exchange terms. J. Chem. Phys., 118, 9149-9157,.
- 66** Zerrad, Essaid, A. Khan, K. Zerrad and G.H. Rawitscher. 2003 Singular-value Ddecomposition Method in Atomic Scattering. Can. J. Phys. 81: 1215-1221,.
- 67** Rawitscher, G.H., and D. Lukaszek. 2004 Existence of a Nonlocality in the nucleon-¹⁶O Optical Potential and its Physical Origin. Phys. Rev. C 69, 044608,

- 68** Rawitscher, G. H. and I. Koltracht, 2005 Description of an Efficient Numerical Spectral Method for Solving the Schroedinger Equation, *CISE (Computing in Science and Engineering)* 7 (Nov-Dec) pp 58-66,
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J. of Phys. G.:Nuclear and Particle Physics, 31, S1589-92,
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- 71** Gloeckle, W. and G. Rawitscher 2006 Scheme for an accurate solution of Faddeev integral equations in configuration space, (Proc. of the 18 th Intern'l.Conf. of Few-body problems in physics Aug. 2006, Santos Brazil)
Nucl. Phys. A, 790: 282-5
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- 73** Rawitscher, G. and W. Gloeckle 2009 Calculation of the two-body scattering K-matrix in configuration space by an adaptive spectral method,
J. Phys. A: Math. Theor. 42 015201,
- 74** Usmani, Q. N., A. Singh, K. Anwar, and G. Rawitscher, 2009 Improved variational many-body wave function in light nuclei, *Phys. Rev. C* 80, 034309,
- 75** Rawitscher, George H. 2009 "Applications of a Numerical Spectral Expansion Method to Problems in Physics; a Retrospective" in *Operator Theory: Advances and Applications* **203** (2009, Birkhauser Verlag, Basel/Switzerland)409-426
- 76** Rawitscher, G and J. Liss, 2011, The Vibrating Inhomogeneous String
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Few Body Systems, 55, #8, 821-824; DOI:10.1007/s00601 - 014- 0827-1

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