

CURRICULUM VITAE
of
CHARLES RAY SMITH

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Fayetteville, TN 37334

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FORMAL EDUCATION

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|---------|--|---------------------------------------|
| 1961-64 | University of Colorado, Boulder, CO
Dissertation: "Investigation of the Role
of Photons in the Non-Relativistic
Many-Body Problem." | Ph.D. (physics), 1967 |
| 1957-58 | University of Wisconsin, Madison, WI | |
| 1956-57 | Universitaet Erlangen, Germany | |
| 1955-56 | Vanderbilt University, Nashville, TN
Thesis: "Bound States of an Exponentially
Shielded Coulomb Potential." | M.S. (physics), 1962 |
| 1953-55 | Vanderbilt University, Nashville, TN | B.A. (physics), Magna Cum Laude, 1955 |
| 1951-53 | Berry College, Rome, GA | |

PROFESSIONAL POSITIONS

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| 1987-96 | Physicist, GS-15, Radar Technology Branch, Advanced Sensors Directorate, Research,
Development, and Engineering Center, U.S. Army Missile Command, Redstone Arsenal,
AL | |
| 1985 -87 | Physicist, GS-14, Sensors Directorate, U.S. Army Strategic Defense Command,
Huntsville, AL | |
| 1972-85 | Associate Professor of Physics, University of Wyoming, Laramie, WY | |
| 1964-72 | Assistance Professor of Physics, University of Wyoming, Laramie, WY | |
| 1981-82 | Visiting Scientist, Research Directorate, U.S. Army Missile Laboratory, Redstone
Arsenal, AL | |
| 1974 -75 | Visiting Scientist, Plasma Theory Group, Oak Ridge National Laboratory, Oak Ridge,
TN | |

- 1969-70 Visiting Faculty Fellow, Theoretical Physics Group, Lawrence Berkeley Laboratory, University of California, Berkeley, CA
- 1961-64 Physicist, National Bureau of Standards, Boulder, CO
- 1960-61 Physicist, Research Laboratory, Army Rocket and Guided Missile Agency, Redstone Arsenal, AL
- 1950-60 Aeronautical Research Engineer, Guidance and Control Laboratory, Army Ballistic Missile Agency, Redstone Arsenal, AL

UNIVERSITY TEACHING

Graduate Courses Taught (with typed lecture notes prepared for many of these courses):

Methods of Theoretical Physics
 Advanced Quantum Theory
 Electromagnetic Theory
 Quantum Electrodynamics
 Quantum Physics
 Probability Theory in Science and Engineering
 Modern Applications of Electromagnetic Theory
 Plasma Physics
 Classical Mechanics
 Many-Body Theory
 Quantum Theory
 Continuum Mechanics

Undergraduate Courses Taught:

General Physics (with laboratory)
 College Physics (with laboratory)
 Energy Perspectives
 Vibrations and Waves
 Solid State Physics
 Physical Optics
 Modern Physics

PUBLICATIONS

"Number of Energy Levels for a Debye-Hueckel or Yukawa Potential," W. G. Holladay, J. B. Thomas and C. R. Smith, *American Journal of Physics* **63**, pp. 16-19. Contributing author.

"Bound States in a Debye-Hueckel Potential," C. R. Smith, *Physical Review* **64**, pp. A1235-A1237. Author.

"Relativistic Dressing of a Free Particle," C. R. Smith, *American Journal of Physics* **68**, pp. 621-624. Author.

"Quantum-Statistical Theory of a Multicomponent Fully Ionized Gas," I. Ramarao and C. R. Smith, *Physical Review* **70**, pp. 843-854. Principal Author.

"Microscopic Theory of a Multicomponent System of Charged and Neutral Particles. I. General Quantum Statistical Formulation," F. Mohling and C. R. Smith, *Journal of Mathematical Physics* 71, pp. 1419-1427. Principal Author.

"Microscopic Theory of a Multicomponent System of Charged and Neutral Particles. II. Investigation of Properties of Photons," A. Bhowmik and C. R. Smith, *Journal of Mathematical Physics* 71, pp. 1427-1436. Principal author.

"Operator Techniques in Three Dimensions," C. R. Smith, *American Journal of Physics* 76, pp. 989-993. Author.

"Intense-Field Quantum Electrodynamics in a Medium. I. Basic Formulation," C. R. Smith, M. Jafarpour and I. Ramarao, *Physical Review* 79, pp. 2074-2092. Principal Author.

"S-Matrix Theory of Reacting Plasmas," C. R. Smith, R. Inguva and K. D. Lain, *Physical Review* 81, pp. 3285-3295. Principal Author.

"Generalized Jastrow Variational Method for Dense Fermi Systems," R. Inguva and C. R. Smith, *Journal of Low Temperature Physics* 83, pp. 1-8. Contributing author.

"Electrodynamics in a Dispersive Medium: E, B, D, and H," C. R. Smith and R. Inguva, *American Journal of Physics* 84, pp. 27-34. Principal Author.

"Maximum-Entropy Inverses in Physics," C. R. Smith, R. Inguva and R. L. Morgan, *Society of Industrial and Applied Mathematics-American Mathematical Society Proceedings* 84, pp. 127-137. Principal Author.

Maximum-Entropy and Bayesian Methods in Inverse Problems, C. R. Smith and W. T. Grandy, eds. (Reidel Publ. Co., Dordrecht, 1985), 504 pages. Senior editor.

"Elektrodinamika Dispergiruyushchikh Sred: E, B, D, e H," C. R. Smith and R. Inguva, (in *Fizika za Rubezhom* Mir Publishers, Moscow, 1986), pp. 116-143. This is a translation of *American Journal of Physics* 84, pp. 27-34. Principal Author.

Maximum-Entropy and Bayesian Spectral Analysis and Estimation Problems, C. R. Smith and G. J. Erickson, eds. (Reidel Publ. Co., Dordrecht, 1987), 334 pages. Senior editor.

"A Variational Method for Classical Fluids," R. Inguva, C. R. Smith, T. M. Huber and G. J. Erickson, in *Maximum-Entropy and Bayesian Spectral Analysis and Estimation Problems*, C. R. Smith and G. J. Erickson, eds. (Reidel Publ. Co., Dordrecht, 1987), pp. 295-304. Contributing author.

"A Precis of Remote Sensing," R. Inguva and C. R. Smith, *Southcon/87 Professional Program, Record* 16/1 (1987), 6 pages. Contributing author.

"Remote Sensing and Ill-Posed Problems," C. R. Smith and R. Inguva, *Southcon/87 Professional Program, Record* 16/2 (1987), 6 pages. Principal Author.

Maximum-Entropy and Bayesian Methods in Science and Engineering. I. Foundations, G. J. Erickson and C. R. Smith, eds. (Kluwer Academic Publishers, Dordrecht, 1988), 328 pages. Co-editor.

Maximum-Entropy and Bayesian Methods in Science and Engineering. II. Applications, G. F. Erickson and C. R. Smith, eds. (Kluwer Academic Publishers, Dordrecht, 1988), 450 pages. Co-editor.

"A Bayesian Analysis of a Chirped Signal," C. R. Smith and G. J. Erickson, in *Applied Time Series Analysis*, C. H. Chen, ed. (World Scientific Publishing Co., Teaneck, NJ, 1989), pp. 105-108. Invited paper. Principal Author.

"Spectral Agility: Rationale and Concepts," J. E. Carroll, C. R. Smith and R. Rodgers, in *Infrared Systems and Components III*, R. L. Caswell, ed., Proc. SPIE 50 1989, pp. 74-87. Principal Author.

"Bayesian Analysis of Signals from Closely-Spaced Objects," G. L. Bretthorst and C. R. Smith, in *Infrared Systems and Components III*, R. L. Caswell, ed., Proc. SPIE 50, 1989, pp. 93-104. Principal Author.

"Parameter Estimation in Chirped Signals," C. R. Smith, G. J. Erickson and P. O. Neudorfer, *Proceedings of the IEEE Pacific Rim Conference on Communications, Computers, and Signal Processing*, 1989, pp. 538-539. Principal Author.

"From Rationality and Consistency to Bayesian Probability," C. R. Smith and G. J. Erickson, in *Maximum-Entropy and Bayesian Methods*, J. Skilling, ed. (Kluwer Academic Publishers, Dordrecht, 1989), pp. 29-44. Invited paper. Principal Author.

"From Chirp to Chip, a Beginning," G. J. Erickson, P. O. Neudorfer and C. R. Smith, in *Maximum-Entropy and Bayesian Methods* J. Skilling, ed. (Kluwer Academic Publishers, Dordrecht, 1989), pp. 505-510. Principal Author.

"Coordinate-Free Operators Based on One Vector. I. Formal Considerations," C. R. Smith, S. R. Rolf and R. Inguva, *Foundations of Physics* 20, 1990, pp. 1111-1122. Principal Author.

"Coordinate-Free Operators Based on One Vector. II. Applications in Electrodynamics," C. R. Smith, S. R. Rolf and R. Inguva, *Foundations of Physics* 20, 1990, pp. 1123-1133. Principal Author.

"Probability Theory and the Associativity Equation," C. R. Smith and G. J. Erickson, in *Maximum-Entropy and Bayesian Methods*, P. F. Fougere, ed. (Kluwer Academic Publishers, Dordrecht, 1990), pp. 17-30. Invited Paper. Principal Author.

"Radar Target Discrimination Using Probability Theory," G. L. Bretthorst, L. S. Riggs and C. R. Smith *Ultra-Wideband Radar: Proceedings of the First Los Alamos Symposium*, B. Noel, ed. (CRC Press, BocaRaton, FL, 1991), pp.417-434. Contributing author.

"Quantum Electrodynamics of the Interaction of a Laser Beam with Charged Particles in a Plasma," *U.S. Army STAS Report* (March 4, 1977), 138 pages.

"Radiative Properties of Air Plasma: Overview of a Literature Survey," *U.S. Army STAS Report* (April 20, 1978), 4 pages.

"Image Restoration and Information Theory," *U.S. Army STAS Report* (October 23, 1981), 11 pages.

"Noiseless Analog and Digital Signals: Maximum-Entropy Restoration," *U.S. Army STAS Report* (June 14, 1983), 36 pages.

"Maximum-Entropy and Bayesian Methods for Image and Signal Restoration," *U.S. Army Laboratory Research Cooperative Program (LRCP) Report* (December 29, 1983), 70 pages.

"Transient Scattering Phenomena, the Singularity Expansion Method and Noncooperative Target Recognition," *Advanced Sensors Letter Report AS-89-34* (July 25, 1989), 14 pages. Published in the *Report of the 32nd Meeting of Subgroup K Radar Technology*, Malvern, England, Oct. 1989. Author.

"Multisensor Data Fusion: Concepts and Principles," C. Ray Smith and G. J. Erickson, *Proceedings of the IEEE Pacific Rim Conference on Communications, Computers, and Signal Processing*, 1991, pp.235-237. Principal Author.

"A Bayesian Approach to Multisensor Data Fusion," C. Ray Smith, in *Signal Processing, Sensor Fusion, and Target Recognition*, V. Libby and I. Kadar, eds., Proc. SPIE 1699, 1992, pp. 285-299. Author.

"Bayesian Probability Theory Applied to the Problem of Radar Target Discrimination," L.S. Riggs and C. Ray Smith, *IEEE Antennas and Propagation Society International Symposium, 1992 Digest*, Chicago, IL, 3, pp. 1246-1249. Contributing Author.

"Target Discrimination Based on High-Range-Resolution (HRR) Transient-Radar Returns Computed from Triangular-Patch Aircraft Models," L.S. Riggs and C. Ray Smith, *Conference Proceedings 8th Annual Review of Progress in Applied Computational Electromagnetics*, 1992, pp. 62-81. Contributing Author.

Maximum Entropy and Bayesian Methods, C. Ray Smith, G. J. Erickson, and P. O. Neudorfer, eds. (Kluwer Academic Publishers, Dordrecht, 1992), 480 pages. Senior Editor.

"On Radar Target Identification," C. Ray Smith, in *Physics and Probability*, W. T. Grandy, Jr., and P.W. Milloni, eds., (Cambridge University Press, 1993), pp. 161-175. Author.

"Radar Target Identification," C. Ray Smith and P. M. Goggans, *IEEE Antennas and Propagation Magazine* 35, 1993, pp.27-37. Principal Author.

"On Waveform Design for Optimal Target Discrimination," L. S. Riggs, M.A. Richards, T. H. Shumpert, and C. Ray Smith, *International Journal of Imaging Systems and Technology* 4, 1993, pp. 327-335. Contributing Author.

"Time-Domain Electromagnetic Responses and Model Uncertainties," R. Inguva, C. Ray Smith, P. M. Goggans and D. J. Andersh, *Conference Proceedings 10th Review of Progress in Applied Computational Electromagnetics*, 1994, pp. 353-363. Principal Author.

"Theory of Radar Target Discrimination," E. T. Jaynes and C. R. Smith, *U.S. Army Missile Command, Tech Rept. RD-AS-91-6*, Feb 91, 24 pages. Contributing Author.

"Coordinate Systems for Radar Target Identification," C. Ray Smith, *U. S. Army Missile Command, Tech.Rept. RD-MG-95-18*, Dec. 95, 14 pages.