# DAVID L. UHRICH

**Present Position**

Professor, Department of Physics; Senior Staff Member,
Liquid Crystal Institute, Kent State University,
Kent, Ohio 44242

**Personal Data**

Address: 707 Berkeley Drive, Kent, Ohio 44240
Telephone: (216) 672-2407 (office); (216) 678-9164 (home)
Birthdate: 5 January 1939
Marital Status: Married, three children
Social Security Number: 097-30-7076

**Education**

1965 Ph.D. (Physics), University of Pittsburgh
1960 B.S. (Physics), Canisius College

**Professional Career**

| | |
|---|---|
| 1976-present | Kent State University, Kent, Ohio; Professor* |
| 1971-1976 | Kent State University, Kent, Ohio; Associate Professor* |
| 1967-1971 | Kent State University, Kent, Ohio; Assistant Professor* |
| 1966-1967 | Iowa State University, Ames, Iowa; Postdoctoral Fellow |
| 1966 | University of Pittsburgh, Pittsburgh, Pa.; Postdoctoral Fellow |
| 1964-1965 | University of Pittsburgh, Pittsburgh, Pa.; NASA Trainee |
| 1962-1964 | University of Pittsburgh, Pittsburgh, Pa.; Research Assistant |
| 1960-1962 | University of Pittsburgh, Pittsburgh, Pa.; Teaching Assistant |

*Full member of Graduate Faculty

**Professional Societies**

American Physical Society, Sigma Xi, Sigma Pi Sigma,
American Association of University Professors,
American Association of Physics Teachers

**Summer Activities**

| | |
|---|---|
| 1968 | Research Associate, Liquid Crystal Institute |
| 1969-1971 | Principal Investigator on AFOSR grant to study liquid crystals, Liquid Crystal Institute |
| 1972-1973 | Principal Investigator on AFOSR and NSF grants to study liquid crystals, Liquid Crystal Institute |
| ,1974 | Summer Research Fellowship, Kent State University; Principal Investigator, NSF grant to study liquid crystals |
| 1975 | Teaching, Kent State University (half-time); Principal Investigator, NSF grant to study liquid crystals (half-time) |
| 1976 | Teaching, Kent State University (half-time); wrote "Forensic Physics" text and lab manual (2nd edition; half-time) |
| 1977 | National Science Foundation Faculty Fellowship: FBI Laboratory, Washington, D.C. |
| 1978 | National Science Foundation Faculty Fellowship: Kent State University |
| 1980 | DOE Summer Workshop Project Director |
| 1981 | NSF Summer Workshop Project Director |
| 1982 | DOE Summer Workshop Project Director |

**DAVID L. UHRICH**

## Teaching Experience

Graduate level courses: Classical Electrodynamics I and II; Thermal Physics I; Group Theory Applied to Atoms, Molecules and Solids; Classical Mechanics I.

Undergraduate level courses: Electricity and Magnetism; Thermodynamics; General Physics for freshmen and sophomores; Energy and the Environment; Seven Ideas that Shook the Universe; Forensic Physics (the last three courses are for non-science majors).

New Course Development:

1. Senior level Nuclear Physics laboratory (1968-1978). During this time I wrote and introduced four new experiments which used up-to-date nuclear detection equipment. These experiments comprised 75% of the material covered in the laboratory.

2. Research Orientation (1973) for both undergraduate and graduate students in physics.

3. Forensic Physics (1975), a non-mathematical physics course and laboratory for Criminal Justice Studies students. This course links physics to potential **job** activities *of* this special group *of* students.

4. Evidentiary Analysis of Traffic Accidents (1979), a course for attorneys.

5. Energy Workshop (1980) for high school science teachers (with Professor Anthony Silvidi).

## Consulting

Consultant and expert witness in criminal and civil cases involving the scientific analysis of traffic accidents.

## Grants and Research Fellowships

Research Fellowships, Kent State University, Fall Quarters, 1968 and 1970

Air Force Office of Scientific Research, Office of Aerospace Research, U.S. Air Force, Grant No. F-44620-69-0021, "Structure and Physical Properties of Liquid Crystals," Principal Investigator, September 1968-September 1973.

Summer Research Fellowship, Kent State University, 1974

National Science Foundation, Grant No. GH-31164X, "Study of the Structure and Physical Properties of Liquid Crystals," Principal Investigator, June 1972-September 1975.

Faculty Development Grant, Kent State University (from the Faculty Development Office), "Camera Optics Experiments in the Forensic Physics Laboratory," March 1975.

Venture Fund Grant, Kent State University (from a Ford Foundation Grant to President Glenn Olds of Kent State University), "Forensic Physics Laboratory," February 1975-June 1976.

Science Faculty Professional Development Award, National Science Foundation, tenure six months to develop "Forensic Physics," June 1976-September 1978.

Department of Energy Faculty Development Project, Summer Workshop for Secondary School Teachers: "Energy Alternatives for Northeastern Ohio," March 1980-March 1981.

National Science Foundation, Pre-College Teacher. Development in Science Program, Summer Workshop for Secondary School Teachers: "Physics for General Science Classes in Secondary Schools," February 1981-July 1982.

Department of Energy Faculty Development Project, Summer Workshop for Secondary School Teachers: "Implementation of Ohio's Energy Education Program," February 1982-May 1983.

**DAVID L. UHRICH**

**Supervision** *of* Dissertations and Theses

| Date | Student | Title | Degre |
|---|---|---|---|
| 1970 | S.M. Dingfelder | A Mossbauer Study of Liquid Crystals | M.A. |
| 1970 | J.M. Wilson | A Mossbauer Investigation of the Liquid Crystalline State | M.A. |
| 1971 | W.A. Resch | Instrumentation for Massbauer Spectroscopy | M.S. |
| 1972 | J.M. Wilson | Mossbauer Spectroscopy in Smectic Liquid Crystals | Ph.D. |
| 7973 | R.R. Eley | The Iron (III) Dithiocarbamates: A Magnetic Susceptibility, Mossbauer Spectroscopy, and High-pressure Electronic Spectral Investigation *of* a Spin-Crossover Equilibrium System (co-director with N.V. Duffy, Department *of* Chemistry) | Ph.D. |
| 1973 | R.E. Detjen | A Mossbauer Investigation of the *Lattice* Dynamics of the Smectic Liquid Crystalline State | Ph.D. |
| 1976 | V.O. Aimiuwu | Fe-57 **Mossbauer** Study *of* Four Ferrocene Derivatives in a Smectic B Liquid Crystalline Glass | Ph.D. |
| 1978 | W.J LaPrice | Iron-57 Mossbauer Temperature Study of Nematic, Smectic B and Smectic H Liquid Crystalline Glasses | Ph.D. |
| 1981 | P.I. Ktorides | Mossbauer Study of the Smectic **Liquid** Crystalline Glass Phase **Using** Sn-bearing Molecules | Ph.D. |
| | 0.3. Todoroff | Sn-119 Mossbauer Investigation *of* Solutions *of* Different Sn-bearing Molecules in Nematic and Smectic Glasses | Ph.D |
| | R.P. Marande | $Fe^{57}$ Mossbauer Study of the Effect of Molecular Order on Rotational Diffusion and Vibrational Anisotropy of Elongated Iran-Bearing Probe Molecules in Nematic, Smectic A **and** Smectic B Liquid Crystalline Glasses | Ph.D |

Publications

1. "Measurement of the Lattice Constant in the Dihydrides of Gadolinium-Yttrium Alloys," D.L. Uhrich, J. Chem. Phys. 44, 2202 (1966).

2. "A Mossbauer Effect Investigation of the Crystalline Electric Field in Thulium Metal," R.G. Barnes, D. Genin and D.L. Uhrich, Phys. Lett. 24A, 338-340 (1967).

3. "Mossbauer-Effect Determination of the Crystalline Electric Field Parameters in Thulium Metal," R.G. Barnes and D.L. Uhrich, Phys. Rev. 164, 428-435 (1967).

4. "Mossbauer-Effect Determination of Crystalline Electric Field Splittings in Several Intermetallic Compounds of Thulium," D.L. Uhrich, R.G. Barnes and D. Genin, Phys. Rev. 166, 261-268 (7368).

5. "A Mossbauer-Effect Determination of $Tm^{+3}$ Crystalline Electric Field Parameters in Thulium-Doped Soda-Silica Glasses," D.L. Uhrich and R.G. Barnes, J. Phys. and Chem. of Glasses 9, 184-189 (1968).

6. "A Mossbauer Investigation of the Smectic Liquid Crystalline State,".J.M. Wilson, W.A. Resch and D.L. Uhrich, Phys. Rev. Lett. 24, 355-358 (1970).

7. "Electron Spin Resonance Investigation of the Conducting Dihydrides of Gadolinium and Gadolinium-Yttrium Alloys," D.L. Uhrich and D.P. Schumacher, J. Chem. Phys. 53, 2284-2290 (1970).

8. "Theory of Mossbauer Spectral Asymmetry of Quadrupole Split Lines in Liquid Crystals," J.M. Wilson and D.L. Uhrich, Mol. Cryst. Liq. Cryst. 13, 85-92 (1971).

9. "The Dependence of Mossbauer Parameters on Magnetic Moments in Iron(III) Dithiocarbamates," R.E. Eley, N.V. Duffy and D.L. Uhrich, Inorg. and Nucl. Chem. 34, 3681-3688 (1972).

10. "A Mossbauer Comparison of the Recoil-Free Fraction of a Supercooled Smectic Liquid Crystal with its Solid State," R.E. Detjen, D.L. Uhrich and C.F. Sheley, Phys. Lett. 42A, 522-524 (1973).

11. "A Mossbauer Study of a Sn-119 Bearing Solute in an Ordered Smectic Liquid Crystal, at 77°K," D.L. Uhrich, Y.Y. Hsu, D.L. Fishel and J.M. Wilson, Mol. Cryst. Liq. Cryst. 20, 349-371 (1973).

12. "Reinterpretation of the Fe-57 Mossbauer Effect of 1-1'-Diacetylferrocene in 4-4'-Bis(heptyloxy)azoxybenzene," J.M. Wilson and D.L. Uhrich, Mol. Cryst. Liq. Cryst. 25, 113-121 (1974).

13. "A Mossbauer Measurement of Some Lattice Properties of a Smectic H Liquid Crystal," D.L. Uhrich, J. Stroh, R. D'Sidocky and D.L. Fishel, Chem. Phys. Lett. 24, 539-542 (1974).

14. "Infrared and Mossbauer Spectral Studies on Some Tin (IV) Complexes: A Qualitative Correlation with the Hard and Soft Acid-Base Theory," W.T. Ayers, M.F. Farona and D.L. Uhrich, Spectroscopy Letters 7, 637-643 (1974).

Publications (cont.)

15. "Smectic B Liquid-Crystalline Glass (at 77°K) as Seen by the Mossbauer Effect of.%-bearing Solute Molecules," D.L. Uhrich, V.O. Aimiuwu, P.I. Ktorides and W.J. LaPrice, Phys. Rev. A 12, 211-218 (1975).

16. "Orientation Dependence of an Unresolved Mossbauer Doublet in an Aligned Liquid Crystalline Glass," P.I. Ktorides and D.L. Uhrich, Mol. Cryst. Liq. Cryst. 40, 285-296 (1977).

77. "(Diorganodithiocarbamato)iron Complexes. Effect of Organic Substituents,". J.B. Zimmerman, T.W. Starinshak, D.L. Uhrich and N.V. Duffy, Inorg. Chem. 16, 3707-3711 (1977).

78. "$^{57}$Fe Mossbauer Study *of* Four Ferrocene Derivatives in a Smectic B Liquid Crystalline Glass," V.O. Aimiuwu and D.L. Uhrich, Mol. Cryst. Liq. Cryst, 43, *295-312* (1977).

19. "The Spin 3/2 State (?) in Six-Coordinate Iron(III). A Mossbauer and EPR Investigation," D.P. Rininger, N.V. Duffy, R.C. Weir, E. Gelerinter J. Stanford and D.L. Uhrich, Chem, Phys. Lett. 52, 102-106 (1977).

20. "Nitrosylbis(diorganodithiocarbamato) Iron Complexes, Effect of Organic Substituents," B. Sarte, J. Stanford, W.J. LaPrice, D.L. Uhrich. T.E. Lockhart, E. Gelerinter and N.V. Duffy, Inorgan. Chem. 17, 3361-3365 (1978).

21. "The FBI Laboratory - A Visitor's View," FBI Laboratory Digest 78-6, 7-11 (1978).

22. "Career-Oriented Physics Courses for Non-Science Majors," D.L. Uhrich, S.H. Christensen, J.M. Wilson, C.K. Manka and P.F. McDonald, Physics Teacher 17, 94-100 (1979).

23. "A Mossbauer Temperature Study of a Cold Nematic Liquid Crystal: Nematic Glass - Supercooled Nematic," W.J. LaPrice and D.L. Uhrich, J. Chem. Phys, 71, 1498-1505 (1979).

24. "A Mossbauer Temperature Study of Two Cold Smectic (B and H) Liquid Crystals W.J. LaPrice and D.L. Uhrich, J. Chem. Phys. 72, 678-686 (1980).

25. "The Dependence of Mossbauer Isomer *Shifts* on Magnetic Moments in Solvated Tris-Dithiocarbamates *of* Iron(III)," D.P. Rininger, J.B. Zimmerman, N.V. Duffy and D.L. Uhrich, J. Inorg. Nucl. Chem. 42, 689-692 (1980).

26. "Six Coordinate Iron(III), the S = 3/2 Ground State and Particle Size," N.V. Duffy, T.E. Lockhart, E. Gelerinter, D.J. Todoroff and D.L. Uhrich, Inorg. Nucl. Chem. Lett. 17, 1-4 (1987).

27. "Ligand Scrambling with Preparation of Mixed Ligand Iron(III) Dithiocarbamate N.V. Ouffy, W.G. Movius and D.L. Uhrich, Inorganic Chimica Acta 64, L91-L93

28. "On the Problem of the Alignment of Smectics Using Magnetic Fields," P.I. Ktorides and D.L. Uhrich, Mol. Cryst: Liq. Cryst. 87, 69-76 (1982).

Publications (cont.)

29. "Sn-119 Mössbauer Effect Study of Two Sn-Bearing Liquid Crystalline Materials," Petros I. Ktorides, David L. Uhrich, Richard M. d'Sidocky, and Derry L. Fishel, J. Chem. Phys. 77, 4188-4198 (1982).

30. "Thiocyanatobis(Diorganodithiocarbamato)Iron(III) Complexes. Effect of **Organic** Substituent," **Norman** V. Duffy **and** David L. Uhrich, **Inorganica** Chimica Acta 63, 5-8 (1982).

Publications (cont.)

Books

1. "Forensic Physics Laboratory Manual," Kent State University Printing Service (September, 1975), 96 pp.

2. "Forensic Physics Text and Laboratory Manual," Kent State University Printing Service (December, 1976), 124 pp.

Proceedings

1. "The Use of Liquid Crystals in Mossbauer Studies and the Use of the Mossbauer Effect in Liquid Crystal Studies," D.L. Uhrich, R.E. Detjen and J.M. Wilson, Mossbauer Effect Methodology, Vol. 8 (Plenum Press, New York, 1973), pp. 175-190.

2. "A Mossbauer Observation of Anisotropic Diffusion Near the Glass Transition of a Smectic H Liquid Crystal," R.E. Detjen and D.L. Uhrich, Mossbauer Effect Methodology, Vol. 9 (Plenum Press, New York, 1974), pp. 113-126.

Reports

1. "Structure and Physical Properties of Liquid Crystals," AFOSR Final Report, Contract No. F-44620-69-C-0021 (1974). (12 co-authors)

2. "Energy Alternatives for Northeastern Ohio--A Workshop for Secondary School Teachers," Final Report, Department of Energy Grant No. DE FG05-80IR10954 (1981), with A.A. Silvidi.

DAVID L. UHRICH

## Presentations

1. "ESR Investigation of Hydrides of Gadolinium and Gadolinium-Yttrium Alloys," APS, Chicago, BAPS 10, 111 (1965).

2. "Mossbauer Effect Investigation of the Crystalline Electric Field in Thulium Metal," APS, Chicago, BAPS 12, 307 (1967), with R.G. Barnes.

3. "Mossbauer Investigation of the Smectic Liquid Crystalline State," Ohio Section, APS, Columbus, October 1969. BAPS 15, 127 (1970), with J.M. Wilson and W.A. Resch.

4. "Mossbauer Spectral Asymmetry in Liquid Crystals," Ohio Section, APS, Granville, October 1970, BAPS 16, 191 (1971), with J.M. Wilson.

5. "Correlation of Mossbauer Spectral Parameters with Magnetic Moment for Iron(III) Dithiocarbamates," APS, Cleveland Ohio, BAPS 16, 333 (1971), with R. Eley, R. Detjen and N. Duffy.

6. "Frozen Solution Mossbaucr Spectra of Iron(III) Dithiocarbamates," Central Regional Meeting of the American Chemical Society, June 1971, Cincinnati, Ohio, with R. Eley, R. Detjen and N. Duffy.

7. "A Mossbauer Effect Measurement of Debye Temperature of a Supercooled Liquid Crystal," IV International Liquid Crystal Conference, Kent State University, Kent, Ohio, August 1972, with R.E. Detjen.

8. "Features of Fe-57 Mossbauer Spectroscopy in Ordered Smectic Liquid Crystals," IV International Liquid Crystal Conference, Kent State University, Kent, Ohio, August 1972, with J.M. Wilson.

9. "Mossbauer Study of a Sn-119 Bearing Solute in an Ordered Smectic Liquid Crystal, Supercooled to 77°K," IV International Liquid Crystal Conference, Kent State University, Kent, Ohio, August 1972, with Y.Y. Hsu, D.L. Fishel and J.M. Wilson.

10. "The Use of Liquid Crystals in Mossbauer Studies and the Use of the Mossbauer Effect in Liquid Crystal Studies," 8th Mossbauer Symposium, New York, January 1973, with R.E. Detjen and J.M. Wilson.

11. "Liquid Crystal Lattice Dynamics as Observed by the Mossbauer Effect," Ohio Academy of Science, Cleveland, April 7973, with R.E. Detjen.

12. "A Mossbauer Determination of the Tilt Angle and 'the Vibrational Anisotropy (at 77°K) of a Smectic H Liquid Crystal," APS, Cleveland, Ohio, BAPS 19, 174 (1974).

13. "A Mossbauer Observation of Anisotropic Diffusion Near the Glass Transition of a Smectic H Liquid Crystal," 9th Mossbauer Symposium, Chicago, February 1974, with R.E. Detjen.

14. "Spectral Studies of Carbonyl Complexes of Iron(II) Dithiocarbamates," Central Regional Meeting of the American Chemical Society, Morgantown, West Virginia, May 1975, with T.W. Starinshak, J. Zimmerman and N.V. Duffy.

Presentations (cont.)

15. "Fe-57 Mossbauer Studies in a Smectic B Glass," Ohio Section, APS, Kent, Ohio, May 1.975, BAPS 20, 887 (1975).

16. "A Sn-119 Mossbauer Study of the Smectic Glass Phase of p-(17-trimethyltin)-undecyloxybenzylidene-p'-n-butylaniline," Ohio Section, APS, Kent, Ohio, May 1975, BAPS 20, 886 (1975), with P.I. Ktorides, R.M. D'Sidocky and D.L. Fishel.

17. "Forensic Physics - Course and Laboratory," Ohio Section, **APS**, Kent, Ohio, May 1975, BAPS 20, 887 (1975).

18. "Bonding in tris-diorganodithiocarbarnate Iron III Complexes: The Methyl Methoxy Derivative," American Chemical Society Central Regional Meeting, Akron, Ohio, May 1976, with J.B. Zimmerman and **N.V.** Duffy.

19. "Carbonyl Substituted Dithiocarbamates of Iron II," American Chemical Society Central Regional Meeting, Akron, Ohio, May 1976, with J.B. Zimmerman and. **N.V.** Duffy.

20. "Orientation Dependence *of* an Unresolved Mossbauer Quadrupole Doublet in an Aligned Liquid Crystalline Glass," Sixth International Liquid Crystal Conference, Kent, Ohio, August 1976, with P.I. Ktorides.

21. "Fe-57 Mossbauer Study *of* Four Ferrocene Derivatives in a Smectic 5 Liquid Crystalline Glass," Sixth International Liquid Crystal Conference, Kent, Ohio, August 1976, with V.O. Aimiuwu.

**22.** "A Mossbauer Temperature Study of an Fe-bearing Probe Molecule **in** a Smectic B Liquid Crystalline Glass," Ohio Section, APS, Akron, Ohio, October 1976, BAPS 22, 209 (1977), with W.J. LaPrice,

**23.** "A Mossbauer Study *of* Two Sn-bearing Liquid Crystals and **a** Solution of 1,1'-Diacetylferrocene in One of Them," Ohio Section, APS, Cleveland, Ohio, May 1978.

24. "A Temperature and Orientation Mossbauer Study *of* a Nematic Liquid Crystalline Glass," Ohio Section, APS, Cleveland, Ohio, May 1978, with W.J. LaPrice.

**25.** "Nitrosyl-Bis(Diorganodithiocarbamate) Iron Complexes - Effect of Organic Substituents," American Chemical Society North Central Regional Meeting, Indianapolis, Indiana, May 1978, with B. Sarte, E. Gelerinter and N.V. Duffy.

26. "Using Science to Solve Crimes," National Science Teachers Association, Cleveland, Ohio, October 1980.

27. "Mossbauer Studies *of* 1,1'-Diacetylferrocene in a Smectic B Liquid Crystalline Material," Ohio Section, APS, Granville, Ohio, May 1981, BAPS 26, 804 (1981), with R. Marande.

28. "Mossbauer Study of Sn-119 Probe Molecules in Nematic and Smectic Glasses," Ohio Section, APS, Granville, Ohio, May 1981, **BAPS** 26, 804 (1981), with D. Todoruff.

**Presentations** (cont.)

29. "Relative Impurity-Host Force Constants in Liquid Crystalline Glasses from Mössbauer Studies," Douglas C. Todoroff and David L. Uhrich, Spring Meeting of the Ohio Section of the American Physical Society, Akron, Ohio (May 7-8, 1982); Bull. Am. Phys. Soc. __,

30. "Mössbauer Studies of Ferrocenyl-4'-Methoxyaniline in a Smectic B Liquid Crystalline Material," R.P. Marande' and David L. Uhrich, Spring Meeting of the Ohio Section of the American Physical Society, Akron, Ohio (May 7-8, 1982); Bull. Am. Phys. Soc. __,