LOUIS AUB BLOOMFIELD

Professor
Department of Physics
University of Virginia

PERSONAL

Male
Date of Birth: October 11, 1956
Married (2 Children)

PROFESSIONAL EXPERIENCE

Professor of Physics, University of Virginia, Charlottesville, VA (1996–Present)
Associate Professor of Physics, University of Virginia, Charlottesville, VA (1991–96)
Assistant Professor of Physics, University of Virginia, Charlottesville, VA (1985–91)
Postdoctoral Member of Technical Staff, AT&T Bell Laboratories, Holmdel, NJ (1983–85)
Postdoctoral Research Associate, Stanford University, Stanford, CA (1983)

EDUCATION

Ph.D. Physics, 1983 (Theodor W. Hänsch, Thesis Advisor)
National Science Foundation Predoctoral Fellow
Stanford University, Stanford, California

B.A. Physics, *Summa Cum Laude*, 1979
Amherst College, Amherst, Massachusetts

HONORS AND AWARDS

Phi Eta Sigma Teacher of the Year (University of Virginia), 2003
Henry St. George Tucker Award (University of Virginia), 2002
George B. Pegram Medal for Excellence in Teaching (SESAPS), 2001
Exemplary Service Award for How Things Work Website (Virtual Reference Desk), 1999
Frank R. Haig Prize (American Association of Physics Teachers, Chesapeake Section), 1998
Outstanding Faculty Award (State Council of Higher Education in Virginia), 1998
Phi Eta Sigma Teacher of the Year (University of Virginia), 1995
Fellow of the American Physical Society, 1994
President and Visitors Research Prize (University of Virginia), 1994
Alumni Board of Trustees Young Faculty Teaching Award (University of Virginia), 1992
Alfred P. Sloan Fellowship, 1989
Young Investigator Award (Office of Naval Research), 1988
Presidential Young Investigator Award (National Science Foundation), 1986
Apker Award in Physics (American Physical Society), 1979
Walker Prize in Mathematics (Amherst College), 1977
Bassett Prize in Physics (Amherst College), 1975

PUBLICATIONS

One hundred four publications in the fields of atomic clusters, physics education, autoionizing states, high-resolution laser spectroscopy, nonlinear optics, and computer science.

PROFESSIONAL ASSOCIATIONS AND ACITIVIES

Member of the American Physical Society, Optical Society of America, Sigma Xi

PUBLICATIONS OF LOUIS A. BLOOMFIELD

1. The Simple Project (J. Lackmann, L. A. Bloomfield, D. Bloomfield, and F. Pennington), in Proceedings of the 5th Annual Pittsburgh Conference on Modeling and Simulation, W. G. Vogt and M. H. Mickle, eds., Instrument Society of America, Pittsburgh (1974), p. 527.

2. A Local Node in a Medical Depository Network (T. Chen, A. B. Baskin, D. Jones, L. Sherman, L. A. Bloomfield, and A. Levy), in Proceedings of the IEEE First International Computer Software and Applications Conference, H. Hayman, ed., IEEE, New York (1977), p. 66.

3. A Computer Network for Corporate Communication (T. T. Chen, L. E. Sherman, M. Williams, and L. A. Bloomfield), in L'Insertion de L'Informatique un Facteur de Progres, Paris (1978)

4. Community-Based Computerized Donor Record Systems (J. D. Moll, C. Drummond, L. A. Bloomfield, T. T. Chen, and B. T. Williams), Transfusion **18**, 181 (1978).

5. Program as Higher Level Subroutines (D. Jones, A. B. Baskin, T. Chen, and L. A. Bloomfield), Software-Practice and Experience **9**, 149 (1979).

6. Saturation Spectroscopy of Ultraviolet Transitions in Mercury with a Frequency-Doubled CW Ring Dye Laser (B. Couillaud, L. A. Bloomfield, J. E. Lawler, A. Siegel, and T. W. Hansch), Opt. Comm. **35**, 359 (1980).

7. Hyperfine Structure of the 23S - 53P Transition in 3He by High Resolution UV-Laser Spectroscopy (L. A. Bloomfield, B. Couillaud, Ph. Dabkiewicz, H. Gerhardt, and T. W. Hansch), Phys. Rev. A. Rapid Comm. **26**, 713 (1982).

8. Generation of Continuous-Wave Ultraviolet Radiation by Sum-Frequency Mixing in an External Ring Cavity (B. Couillaud, Ph. Dabkiewicz, L. A. Bloomfield, and T. W. Hansch), Optics Letters **7**, 265 (1982).

9. Nonlinear UV-Laser Spectroscopy of the 23S - 53P Transition in the 3He and 4He (L. A. Bloomfield, H. Gerhardt, T. W. Hansch, and S. C. Rand), Opt. Comm. **42**, 247 (1982).

10. Singlet-Triplet Mixing in the 13d Rydberg State of 3He Observed with Stepwise Laser Excitation (L. A. Bloomfield, H. Gerhardt, and T. W. Hansch), Phys. Rev. A Rapid Comm. **26**, 3716 (1982).

11. Ultraviolet-Infrared Double Resonance Laser Spectroscopy of nd (n = 12 - 17) Rydberg States in 3He (L. A. Bloomfield, H. Gerhardt, and T. W. Hansch), Phys. Rev. A**27**, 850 (1983).

12. Singlet-Triplet Mixing in ns (n = 12 - 14) Rydberg States of 3He (L. A. Bloomfield, H. Gerhardt, and T. W. Hansch), J. Phys. B**16**, L89 (1983).

13. Specific Mass Shift in the 1s2s 3S and 1s5p 3P States of Helium (L. A. Bloomfield, H. Gerhardt, and T. W. Hansch), Phys. Rev. A Rapid Comm. A**27**, 2261 (1983).

14. CW Ultraviolet Saturation Spectroscopy of the 6p3P0 - 9s3S1 Transition in Mercury at 246.5 nm (L. A. Bloomfield, B. Couillaud, E. A. Hildum, and T. W. Hansch), Opt. Comm. **45**, 87 (1983).

15. Generation of Continuous-Wave Radiation near 243 nm by Sum-Frequency Mixing in an External Ring Cavity (B. Couillaud, L. A. Bloomfield, and T. W. Hansch) Optics Letters **8**, 259 (1983).

16. Correlations in Highly Excited Two-Electron Atoms: "Planetary" Behavior (W. E. Cooke, R. M. Jopson, L. A. Bloomfield, R. R. Freeman, and J. Bokor), in Laser Techniques in the Extreme Ultraviolet, S. E. Harris and T. B. Lucatorto, eds., AIP, New York (1984), p. 91.

17. Angular Momentum Dependence of Autoionization Rates in Doubly Excited Rydberg States of Ba (L. A. Bloomfield, R. R. Freeman, W. E. Cooke, and J. Bokor), Phys. Rev. Lett. **53**, 2234 (1984).

18. Multiphoton Excitation of Doubly Excited States of Two-Electron Atoms (R. R. Freeman, L. A. Bloomfield, W. E. Cooke, J. Bokor, and R. M. Jopson), in Proceedings of the 3rd International Conference on Multiphoton Processes, P. Lambropoulos and S. J. Smith, eds., Iraklion, Crete (1984).

19. Photofragmentation of Mass-Resolved Si+2-12 Clusters (L. A. Bloomfield, R. R. Freeman, and W. L. Brown), Phys. Rev. Lett. **54**, 2246 (1985).

20. Negative and Positive Cluster Ions of Carbon and Silicon (L. A. Bloomfield, M. E. Geusic, R. R. Freeman, and W. L. Brown), Chem. Phys. Lett. **121**, 33 (1985).

21. Laser Investigations of Electron Correlations: Doubly Excited States of Ba (R. R. Freeman, L. A. Bloomfield, J. Bokor, and W. E. Cooke), in Laser Spectroscopy VII, T. W. Hansch and Y. R. Shen, eds., Springer-Verlag, Berlin (1985), p. 77.

22. Negative and Positive Clusters of Semiconductor Ions (L. A. Bloomfield, M. E. Geusic, R. R. Freeman, and W. L. Brown), in Laser Spectroscopy VII, T. W. Hansch and Y. R. Shen, eds., Springer-Verlag, Berlin (1985), p. 320.

23. Photofragmentation of Mass-Resolved Carbon Cluster Ions: Observation of a "Magic" Neutral Fragment (M. E. Geusic, T. J. McIlrath, M. Jarrold, L. A. Bloomfield, R. R. Freeman, and W. L. Brown), J. Chem. Phys. **84**, 2421 (1986).

24. Experiments on Mass-Resolved Clusters of Semiconductors (L. A. Bloomfield, M. E. Geusic, R. R. Freeman, and W. L. Brown), in Electronic and Atomic Collisions, D. C. Lorents, W. E. Meyerhof, and J. R. Peterson, eds., Elsevier, Amsterdam (1986), p. 807.

25. Photofragmentation of Mass Resolved Carbon Cluster Ions (M. E. Geusic, M. F. Jarrold, T. J. McIlrath, L. A. Bloomfield, R. R. Freeman, and W. L. Brown), Z. Phys. D**3**, 309 (1986).

26. Microwave Multiphoton Transitions between Rydberg States of Potassium (L. A. Bloomfield, R. C. Stoneman, and T. F. Gallagher), Phys. Rev. Lett. **57**, 2512 (1986).

27. Production and Photofragmentation of Semiconductor Clusters and Cluster Ions (L. A. Bloomfield, M. E. Geusic, T. J. Geusic, T. J. McIlrath, M. F. Jarrold, R. R. Freeman, and W. L. Brown), in Microclusters, S. Sugano, Y. Nishina, and S. Ohnishi, eds. (Springer-Verlag, Berlin, 1987) p. 238.

28. Photofragmentation and Stability in Semiconductor Microcluster Ions (L. A. Bloomfield), in Physics and Chemistry of Small Clusters, P. Jena, B. K. Rao, and S. N. Khanna, eds. (Plenum, New York, 1987) p. 219.

29. Mass-Resolved Clusters of Semiconductors (L. A. Bloomfield), in Proceedings of the 6th Symposium on Atomic and Surface Physics, A. Pesnelle, F. Gounand, M. Cherit, and F. Fabre, eds., La Plagne, France (1988) p. 259.

30. Alkali-Halide Cluster Ions Produced by Photofragmentation of the Solid (C. W. S. Conover, Y. A. Yang, and L. A. Bloomfield), in Proceedings of the 6th Symposium on Atomic and Surface Physics, A. Pesnelle, F. Gounand, M. Cherit, and F. Fabre, eds., La Plagne, France (1988) p. 288.

31. Laser Vaporization of Solids into an Inert Gas: A Measure of High-Temperature Cluster Stability (C. W. S. Conover, Y. A. Yang, and L. A. Bloomfield), Phys. Rev. B38, 3517 (1988).

32. Excimer-Laser Pumped Infrared Dye Laser at 907 nm - 1023 nm (L. A. Bloomfield), Opt. Commun. **70**, 223 (1989).

33. A Time-of-Flight Mass Spectrometer for Large Molecular Clusters Produced in Supersonic Expansions (C. W. S. Conover, Y. J. Twu, Y. A. Yang, and L. A. Bloomfield), Rev. Sci. Instrum. **60**, 1065 (1989).

34. Production and Photodetachment of Stoichiometric Sodium Chloride Cluster Anions (Y. A. Yang, C. W. S. Conover, and L. A. Bloomfield), Chem. Phys. Lett. **158**, 279 (1989).

35. Threshold Shifts in Strong Radiation Fields: The Connection Between DC and AC Effects (L. A. Bloomfield), Phys. Rev. Lett. **63**, 1578 (1989).

36. Photodetachment-threshold shifts in two-frequency radiation fields (L. A. Bloomfield), J. Opt. Soc. Am. B**7**, 472 (1990).

37. A Pulsed Supersonic Expansion with a Source Temperature Below 100 K (J. P. Bucher, D. C. Douglass, P. Xia, and L. A. Bloomfield), Rev. Sci. Instrum. **61**, 2374 (1990).

38. Alkali-Halide Cluster Ions Produced by Laser Vaporization of Solids (Y. J. Twu, C. W. S. Conover, Y. A. Yang, and L. A. Bloomfield), Phys. Rev. B**42**, 5306 (1990).

39. Experimental and Theoretical Studies of the Structure, Binding Properties, and Electronic Structure in Clusters (L. A. Bloomfield, C. W. S. Conover, Y. A. Yang, and Y. J. Twu), Proceedings of the Special Symposium on Advanced Materials-II, Osaka (1990).

40. Statistical Description of the Electronic-Level Structure of Small Metallic Particles, J. P. Bucher, P. Xia, and L. A. Bloomfield, Phys. Rev. B**42**, 10858 (1990).

41. Direct Ejection of Clusters from Non-Metallic Solids During Laser Vaporization (Y. A. Yang, P. Xia, A. L. Junkin, and L. A. Bloomfield), Phys. Rev. Lett. **66**, 1205 (1991).

42. Calculations of the Binding Energies and Structures of Sodium Chloride Clusters and Cluster Ions (N. G. Phillips, C. W. S. Conover, L. A. Bloomfield), J. Chem. Phys. **94**, 4980 (1991).

43. Magnetic Deflection of Neutral Metal Clusters (J. P. Bucher, D. C. Douglass, P. Xia, B. Haynes, and L. A. Bloomfield), Z. Phys. D**19**, 251 (1991).

44. Magnetic Properties of Free Cobalt Clusters (J. P. Bucher, D. C. Douglass, and L. A. Bloomfield), Phys. Rev. Lett. **66**, 3052 (1991).

45. Experimental and Theoretical Studies of the Structure of Alkali Halide Clusters (L. A. Bloomfield, C. W. S. Conover, Y. A. Yang, Y. J. Twu, and N. G. Phillips), Z. Phys. D**20**, 93 (1991).

46. Localization in Small fcc-Particles with Surface Irregularities and Disorder (J. P. Bucher and L. A. Bloomfield), Z. Phys. D**20**, 361 (1991).

47. Evidence for the Direct Ejection of Clusters from Alkali-Halides During Laser Vaporization (L. A. Bloomfield, Y. A. Yang, P. Xia), Z. Phys. D**20**, 461 (1991).

48. Evidence for the Direct Ejection of Clusters from Non-Metallic Solids During Laser Vaporization (L. A. Bloomfield, Y. A. Yang, P. Xia, and A. L. Junkin), Mat. Res. Soc. Symp. Proc. **206**, 105 (1991).

49. Fractal Aggregation of Magnetic Particles (J. P. Bucher, N. D. Rizzo, J. G. Louderback, and L. A. Bloomfield), Mat. Res. Soc. Symp. Proc. **206**, 443 (1991).

50. Heisenberg Model of Subdomain fcc-Clusters: a Monte Carlo Study (J. P. Bucher and L. A. Bloomfield), Phys. Rev. B**45**, 2537 (1992).

51. Ultraviolet Photoelectron Spectroscopy and Photofragmentation Studies of Excess Electrons in Potassium Iodide Cluster Anions (Y. A. Yang, L. A. Bloomfield, C. Jin, L. S. Wang, and R. E. Smalley), J. Chem. Phys. **96**, 2453 (1992).

52. Magnetic Studies of Free Non-Ferromagnetic Clusters (D. C. Douglass, J. P. Bucher, and L. A. Bloomfield), Phys. Rev. B**45**, 6341 (1992).

53. Magic Numbers in the Magnetic Properties of Gadolinium Clusters (D. C. Douglass, J. P. Bucher, and L. A. Bloomfield), Phys. Rev. Lett. **68**, 1774 (1992).

54. Magnetic Properties of Free Metal Clusters (D. C. Douglass, J. P. Bucher, D. B. Haynes, and L. A. Bloomfield), in *Physics and Chemistry of Finite Systems: From Clusters to Crystals*, Vol. I, P. Jena, et al., eds (Kluwer Academic, Amsterdam, 1992), pp. 759-765.

55. Photoelectron Spectroscopy of Weakly-Bound Electrons in Sodium Chloride Cluster Anions (P. Xia, A. J. Cox, Y. A. Yang, and L. A. Bloomfield), in *Physics and Chemistry of Finite Systems: From Clusters to Crystals*, Vol. II, P. Jena, et al., eds (Kluwer Academic, Amsterdam, 1992), pp. 1019-1024.

56. Pulsed Supersonic Source Producing Clusters with an Adjustable Vibrational Temperature (J. P. Bucher, D. C. Douglass, and L. A. Bloomfield), Rev. Sci. Instrum. **63**, 5667 (1992).

57. Magnetic Structure of Clusters (L. A. Bloomfield, J. P. Bucher, and D. C. Douglass), in *ON CLUSTERS AND CLUSTERING, From Atoms to Fractals*, P. J. Reynolds, ed. (Elsevier, Amsterdam, 1993), pp. 193-208.

58. Experimental and Theoretical Studies of Single Excess Electrons in Sodium Chloride Cluster Anions (P. Xia, Naichang Yu, and L. A. Bloomfield), Phys. Rev. B**47**, 10040 (1993).

59. Accommodation of Two Excess Electrons in Sodium Chloride Cluster Anions (P. Xia and L. A. Bloomfield), Phys. Rev. Lett. **70**, 1779 (1993).

60. Magnetism of Free Transition Metal and Rare Earth Clusters (J. P. Bucher and L. A. Bloomfield), Int. J. Mod. Phys. B**7**, 1079 (1993).

61. Magnetic Properties of Free Cobalt and Gadolinium Clusters (D. C. Douglass, A. J. Cox, J. P. Bucher, and L. A. Bloomfield), Phys. Rev. B**47**, 12874 (1993).

62. Photoelectron Spectroscopy of Sodium Chloride Anions with Two Excess Electrons (P. Xia, A. J. Cox, and L. A. Bloomfield), Z. Phys. D**26**, 184 (1993).

63. Experimental Observation of Magnetism in Rhodium Clusters (A. J. Cox, J. G. Louderback, and L. A. Bloomfield), Phys. Rev. Lett. **71**, 923 (1993).

64. Magnetic Properties of Nickel Clusters (J. G. Louderback, A. J. Cox, L. J. Lising, D. C. Douglass, and L. A. Bloomfield), Z. Phys. D**26**, 301 (1993).

65. Magnetic Properties of Rare Earth Clusters (A. J. Cox, D. C. Douglass, J. G. Louderback, A. M. Spencer, and L. A. Bloomfield), Z. Phys. D**26**, 319 (1993).

66. Evidence for a Phase Separation in Metal-Rich Alkali-Halide Cluster Anions (P. Xia and L. A. Bloomfield), Phys. Rev. Lett. **72**, 2577 (1994).

67. Magnetism in 4*d*-Transition-Metal Clusters (A. J. Cox, J. G. Louderback, S. E. Apsel, and L. A. Bloomfield), Phys. Rev. B**49**, 12295 (1994).

68. Structure and Electron Localization of Anionic NaCl Clusters with Excess Electrons (Naichang Yu, Ping Xia, L. A. Bloomfield, and Michael Fowler), J. Chem. Phys. **102**, 4965 (1995).

69. Surface-Enhanced Magnetism in Nickel Clusters (S. E. Apsel, J. W. Emmert, J. Deng, and L. A. Bloomfield), Phys. Rev. Lett. **76**, 1441 (1996).

70. Spontaneous Thermal Isomerization in Isolated Alkali-Halide Clusters (D. J. Fatemi, F. K. Fatemi, and L. A. Bloomfield), Phys. Rev. A**54**, 3674 (1996).

71. *How Things Work: the Physics of Everyday Life* (L. A. Bloomfield), John Wiley, New York, Copyright 1997.

72. Magnetism in Clusters (S. E. Apsel, J. W. Emmert, J. Deng, J. G. Louderback, and L. A. Bloomfield) in *Science and Technology of Atomically Engineered Materials*, P. Jena, S. N. Khanna, and B. K. Rao, Eds. (World, Singapore, 1996), p. 325

73. Thermal Isomerization in Isolated Cesium-Halide Clusters (F. K. Fatemi, D. J. Fatemi, L. A. Bloomfield), Phys. Rev. Lett. **77**, 4895 (1996).

74. *How Things Work: Instructor's Manual* (L. A. Bloomfield), John Wiley, New York, Copyright 1997.

75. Emergence of Metallic Properties in Alkali-Rich Alkali Halide Clusters (D. J. Fatemi, F. K. Fatemi, and L. A. Bloomfield), Phys. Rev. B**55**, 10094 (1997).

76. How Things Work: A Physics Course for Non-Scientists (L. A. Bloomfield), Phys. Teacher **35**, 439 (1997).

77. (Clocks)…to Tuning Forks and Remarkable Accuracy (L. A. Bloomfield), Washington Post, December 9, 1998, H3.

78. Magnetic Properties of Isolated Rare Earth Clusters (L. A. Bloomfield, J. Deng, A. J. Cox, J. W. Emmert, F. K. Fatemi, H. Zhang, D. B. Haynes, J. G. Louderback, D. C. Douglass, J. P. Bucher, and A. M. Spencer), in *Proceedings of the Workshop on Magnetism and Electronic Correlations in Local-Moment-Systems: Rare-Earth Elements and Compounds* , M. Donath, P. A. Dowben, and W. Nolting, eds. (World Sci., Singapore, 1998), p. 153-169.

79. The Flight of the Frisbee (L. A. Bloomfield), Sci. Am. **280**, No. 4, 132 (1999).

80. Thermal Isomerization in Isolated Cesium-Halide Cluster Anions (F. K. Fatemi, D. J. Fatemi, and L. A. Bloomfield), J. Chem. Phys. **110**, 5100 (1999).

81. Krazy Glue (L. A. Bloomfield), Sci. Am. **280**, No. 6, 104 (1999).

82. Physics Provides Answers to Common Household Questions (M. Hendrick and L. A. Bloomfield), USA Today, June 1, 1999, 7.

83. Why Bikes Work (L. A. Bloomfield), Washington Post, June 9, 1999, H1.

84. Air Conditioners (L. A. Bloomfield), Sci. Am. **281**, No. 2, 100 (1999).

85. Laser Printers (L. A. Bloomfield), Sci. Am. **281**, No. 4, 128 (1999).

86. The Science of Football (L. A. Bloomfield), Washington Post, October 13, 1999, H1.

87. A review of *Strange Beauty* by George Johnson (L. A. Bloomfield), New York Times Book Review, October 17, 1999, 8.

88. Television Goes Digital (L. A. Bloomfield), Physics Today **52**, No. 11, 42 (1999).

89. Water Filters (L. A. Bloomfield), Sci. Am. **281**, No. 6, 108 (1999).

90. Electronic Excitation and Thermal Effects in Alkali-Halide Cluster Anions (F. K. Fatemi, A. J. Dally, and L. A. Bloomfield), Phys. Rev. Lett. **84**, 51 (2000).

91. Catalytic Converters (L. A. Bloomfield), Sci. Am. **282**, No. 2, 88 (2000).

92. Magnetism and Magnetic Isomers in Chromium Clusters (L. A. Bloomfield, J. Deng, H. Zhang, J. W. Emmert) in *Proceedings of the International Symposium on Cluster and Nanostructure Interfaces*, P. Jena, S. N. Khanna, and B. K. Rao, eds. (World, Singapore, 2000) p. 131-138.

93. Cleaning Agents (L. A. Bloomfield), Sci. Am. **282**, No. 4, 88 (2000).

94. How Things Work: the Physics of Everyday Life, 2nd Edition (L. A. Bloomfield), John Wiley, New York, Copyright 2001.

95. Photoelectron Spectroscopy of Sodium Iodide Clusters Containing Single Hydroxyl Ions or Water Molecules (D. J. Fatemi and L. A. Bloomfield), Phys. Rev. A66, 013202 (2002).

96. Time-Resolved Dynamics of Thermal Isomerization in Cesium-Halide Cluster Anions (A. J. Dally and L. A. Bloomfield), Phys. Rev. Lett. **90**, 063401 (2003).

97. Photodesorption of Alkali Anions from Alkali-Halide Cluster Anions (F. K. Fatemi, A. J. Dally, and L. A. Bloomfield), Phys. Rev. Lett. **91**, 073401 (2003).

98. How Things Work: The Physics of Everyday Life, 3rd Edition (L. A. Bloomfield), John Wiley, New York, Copyright 2006.

99. How Everythings Works: Making Physics out of the Ordinary (L. A. Bloomfield), John Wiley, New York, Copyright 2007.

100. Magnetism and Magnetic Isomers in Free Chromium Clusters (F. W. Payne, Wei Jiang, and L. A. Bloomfield), Phys. Rev. Lett. **97**, 193401 (2006).

101. Duplicate Publication and 'Paper Inflation' in the Fractals Literature (R. N. Kostoff, D. Johnson, J. A. Del Rio, L. A. Bloomfield, M. F. Shlesinger, G. Malpohl, and H. D. Cortes), Sci. Eng. Ethics **12**, 543 (2006).

102. Magnetic Structure of Free Cobalt Clusters Studied with Stern-Gerlach Deflection Experiments (F. W. Payne, Wei Jiang, J. W. Emmert, Jun Deng, and L. A. Bloomfield), Phys. Rev. B75, 094431 (2007).

103. How Everything Works: Making Physics out of the Ordinary, Paperback Revision (L. A. Bloomfield), John Wiley, New York, Copyright 2008.

104. How Things Work: The Physics of Everyday Life, 4th edition (L. A. Bloomfield), John Wiley, New York, Copyright 2010.

PATENTS OF LOUIS A. BLOOMFIELD

1. High Density Magnetic Recording Medium (David C. Douglass, Jean Pierre Bucher, Louis Aub Bloomfield), Pat. No. 5,830,588 (Nov. 3, 1998).

MAJOR WEBSITES OF LOUIS A. BLOOMFIELD

1. http://www.howeverythingworks.org, "How Everything Works: Explaining the Physics of Everyday Life", Approximate traffic: 1 million unique visits per year.

2. http://plagiarism.phys.virginia.edu, "The Plagiarism Resource Site", Approximate traffic:

INVITED TALKS OF LOUIS A. BLOOMFIELD

1. "Superfluid Onset in Unsaturated Helium Films on Graphite", APS General Meeting, Chicago, 1980.

2. "Experiments on Mass-Resolved Clusters of Silicon", APS Solid State Meeting, Baltimore, March 1985.

3. "Laser Production and Spectroscopy of Clusters of Semiconductors", Seventh International Conference on Laser Spectroscopy (SEICOLS), Hawaii, June 1985.

4. "Experiments on Mass-Resolved Clusters of Semiconductors", International Conference on the Physics of Electron and Atomic Collisions (ICPEAC), Stanford, August 1985.

5. "Production and Photofragmentation of Semiconductor Clusters and Cluster Ions",NEC Symposium on Fundamental Approach to New Material Phases, Tokyo, October 1986.

6. "Production and Photofragmentation of Semiconductor Clusters and Cluster Ions", International Symposium on the Physics and Chemistry of Small Clusters, Richmond, October 1986.

7. "Mass-Resolved Clusters of Semiconductors", 6th Symposium on Atomic and Surface Physics, La Plagne, France, January 1988.

8. "Experimental and Theoretical Studies of the Atomistic Structure, Binding Properties, and Electronic Structure in Atom Clusters", Second International Symposium on Advanced Materials, Osaka, Japan, February, 1990.

9. "Evidence for the Direct Ejection of Clusters from Non-Metallic Solids During Laser Vaporization", Materials Research Society Symposium on Clusters and Cluster-Assembled Materials, Boston, November, 1990.

10. "The Magnetic Structure of Cobalt and Rare-Earth Clusters", The East Coast Symposium on the Chemistry and Physics of Clusters and Cluster Ions, Baltimore, January, 1991.

11. "The Magnetic Properties of Free Cobalt Clusters", Workshop on Atomic Clusters and Cluster Reactions, Richmond, May, 1991.

12. "The Magnetic Structure of Metal Clusters", The Gordon Conference on Metal and Semiconductor Clusters, Wolfeboro, New Hampshire, August, 1991.

13. "Magnetic Behavior of Free Transition Metal and Rare Earth Clusters", American Chemical Society Meeting, Washington, August 1992.

14. "Magnetism in Transition Metal and Rare Earth Clusters", Workshop on Electronic Excitations and Magnetism in Clusters, East Lansing, September 1992.

15. “Magnetism in Atomic Clusters”, Rosenthal Lecture, New Haven, April, 1993.

16. "Magnetism in Transition Metal and Rare Earth Clusters", Canadian Society for Chemistry, Sherbrooke, Quebec, June, 1993.

17. "Electron Accommodation in Alkali-Halide Clusters", The Gordon Conference on Metal and Semiconductor Clusters, Wolfeboro, New Hampshire, August, 1993.

18. "Magnetism in Clusters", SESAPS Annual Meeting, Columbia, South Carolina, November, 1993.

19. "Magnetic Order in Clusters", APS April Meeting, Washington, April, 1994.

20. “Magnetism in 4d-Transition Metals”, Workshop on the Physics of Finite Systems, Richmond, May, 1994.

21. “Magnetic Order in Clusters of Rhodium and Other Metals”, Seventh International Symposium on Small Particles and Inorganic Clusters, Kobe, Japan, September, 1994.

22. “The Evolution of Magnetic Moments in Clusters”, APS Division of Atomic, Molecular, and Optical Physics Meeting, Toronto, May, 1995.

23. “Magnetism in Clusters”, International Symposium on the Science and Technology of Atomically Engineered Materials”, Richmond, October, 1995.

24. “Magnetism in Clusters”, Eighth Internation Symposium on Small Particles and Inorganic Clusters, Copenhagen, Denmark, July, 1996.

25. "How Things Work: a Novel Approach for Teaching Physics to Non-Scientists", Southeastern Section of the American Physical Society Meeting, Atlanta, November, 1996.

26. “How Things Work: a Novel Approach for Teaching Physics to Non-Scientists”, North Carolina Section of the American Association of Physics Teachers, Wilmington, North Carolina, March, 1997.

27. “How Things Work: a Novel Approach for Teaching Physics to Non-Scientists”, APS/AAPT Conference of Physics Department Chairs, College Park, Maryland, May, 1997.

28. “Magnetic Properties of Isolated Rare Earth Clusters”, Workshop on Magnetism and Electronic Correlations in Local-Moment-Systems: Rare-Earth Elements and Compounds, Berlin, March, 1998.

29. “How Things Work: a Novel Way to Teach Physics to Non-Scientists”, Chesapeak Section of the American Association of Physics Teachers, Charlottesville, November, 1998.

30. “How Things Work: Using Everyday Objects to Teach Physics to Non-Scientists”, APS March Meeting, Atlanta, March, 1999.

31. “How Things Work”, Core Knowledge Conference, Orlando, April 1999.

32. “Magnetism in Isolated Clusters of Atoms”, FIM99 – Frontiers in Magnetism, Stockholm, August, 1999 (talk was not delivered due to family emergency).

33. “Magnetism and Magnetic Isomers in Chromium Clusters”, International Symposium on Clusters and Nanostructured Interfaces, Richmond, October, 1999.

34. “Magnetism and Magnetic Isomers in Chromium Clusters”, International Conference on Science and Technology of Nanostructured Materials, Puri, India, January, 2001.

35. “How Things Work: Using Everyday Objects to Teach Physics to Nonscientists”, AAPT Summer Meeting, Rochester, July, 2001.

36. “How Things Work: Using Everyday Objects to Teach Physics to Nonscientists”, AAPT Fall Meeting, Philadelphia, January, 2002.

37. “Software to Compare Documents for Recycled Text”, 2002 ORI Research Conference on Research Integrity, Potomac, MD, November 2002.

38. “How Things Work”, 2003 Core Knowledge Conference, Phoenix, March 2003.

39. “School as Real Life or The Academy without Borders: Putting Physics and Personal Integrity in Context”, FBI Academy Conference, Charlottesville, March, 2003.

40. “Maintaining Integrity in the Library”, Association of Independent School Librarians Conference, April, 2003.

41. “How Things Work”, New York Section of the American Physical Society Conference, Geneseo, New York, April, 2003.

42. “How Things Work”, American Physical Society April Meeting, Philadelphia, April, 2003.

43. “How Things Work”, DAMOP Meeting, Boulder, May, 2003.

44. “How Things Work”, NIST, April, 2004.

45. “How Things Work”, National Science Foundation, January, 2005.

46. “How Things Work”, National Academy of Engineering Meeting, April, 2005.

47. “Teaching Physics in the Context of Everyday Objects”, American Association of Physics Teachers Summer Meeting, August, 2005.

48. “Spontaneous thermal isomerization and picosecond dynamics in alkali-halide cluster anions,” American Chemical Society Annual Meeting, Washington, August, 2005.

49. “Physics of Football,” University of Virginia Homecoming, September, 2005.

50. “How Some Things Work and Others Don’t,” Southeaster Section of the American Physical Society, November, 2005.

51. “How Things Work,” Jefferson Lab Science Series, March 21, 2006.

52. “More Than the Score: Physics of Football,” University of Virginia Homecoming, September, 2006.

53. "Teaching Physics in Context," 2007 Core Knowledge Conference, Washington, February 2007

54. "How Everything Works: Making Physics Out of the Ordinary", Dartmouth Center for the Advancement of Learning, Dartmouth, New Hampshire, April, 2008

55. "How Things Work", DAMOP 2008 Educator's Day, State College, Pennsylvania, May, 2008

56. "Explaining How Things Work, Even When They Don't", DAMOP 2008 Banquet, State College, Pennsylvania, May 2008

RESEARCH INTERESTS

Dr. Bloomfield's research interests include the study of atomic clusters, atomic and molecular physics, nonlinear optics, and nanostructured and microstructed materials. Atomic clusters are small particles of matter, spanning the size range between molecules and condensed matter. In the area of atomic clusters, he is primarily interested in the emergence of complex solid state properties out of the basic properties of molecules. This work involves both the production of ultrafine particles and the subsequent analysis of their electronic and material properties, primarily through the use of lasers. Recent studies have focused on clusters of the alkali halides and magnetic metals.

His work on alkali halide clusters has demonstrated the appearance of bulk-like properties even in sub-nanometer sized particles, including fcc crystal lattice structure, surface terraces, and color center defects. Photodetachment experiments have studied the electronic structure of metal-rich alkali-halide systems and have identified several mechanism by which these small particles accommodate excess electrons. The search for compositional metal-insulator transitions between the metallic alkali clusters and the insulating alkali-halide clusters has detected phase separations in the sodium- and potassium-halides but smoother transitions in the cesium-halides. Spontaneous thermal isomerization has also been observed in certain cesium-halide systems, a precursor to the solid-like to liquid-like phase transition in finite systems. Most recently, experiments have focused on electronically excited states in these systems.

His measurements of magnetism in metal clusters have found a number of interesting properties. Small transition metal particles (iron, cobalt, and nickel) are more magnetic than the bulk, demonstrating that reduced dimensionality, enhanced symmetry, and lower atomic coordination all tend to enhance magnetism in solids. The enhancement is strong enough that rhodium, a 4*d* transition metal that is not normally ferromagnetic, exhibits magnetic order when reduced to cluster dimensions. The rare earth metals (gadolinium, terbium, and dysprosium) also exhibit magnetic order above their bulk Curie temperatures. However this magnetism is reduced from the bulk value, indicating that they are not simply ferromagnetic particles. Measurements in nickel clusters have discovered a strong correlation between a cluster’s surface area and its magnetism, providing evidence for a surface-enhancement of the magnetism in these clusters. Such effects have recently been found to be significantly smaller in cobalt clusters.

Bloomfield’s research in atomic physics has centered around negative ions in strong radiations fields, and Rydberg and autoionizing states in one and two electron atoms. His interests in nonlinear optics have involved the production of short wavelength coherent radiation, using both pulsed and continuous-wave lasers, as well as a number of nonlinear laser spectroscopies.

Bloomfield's research in nanostructured and microstructured materials focuses on developing exotic viscoelastic substances that have different dynamical behaviors at different timescales. Most of these materials are much stiffer on short timescales than they are on long timescales. Patent applications and disclosures are in process on some of those materials.

STUDENT HISTORY

Ph.D. Degrees Awarded:

1. C. W. S. Conover, Studies of the Structure, Binding Properties and Defects in Alkali-Halide Microclusters, May, 1990.

2. Y. A. Yang, Studies of the Formation of Non-Metallic Microclusters and Color Center Type Defects in Alkali Halide Clusters, May, 1991.

3. D. C. Douglass, Magnetic Properties of Transition Metal and Rare Earth Metal Clusters, May, 1992.

4. P. Xia, Photoelectron Spectroscopy of Alkali Halide Clusters with Excess Electrons, May, 1993.

5. A. J. Cox, Magnetic Properties of 4*d*-Transition Metal and Rare Earth Metal Clusters, December, 1993.

6. J. G. Louderback, Magnetic Properties of Iron Clusters, January, 1995

7. D. J. Fatemi, Photoelectron Spectroscopy of Alkali-Halide Clusters Containing Excess Electrons, August, 1995

8. S. E. Apsel, Magnetism in Nickel Clusters, May, 1996.

9. F. K. Fatemi, Electronic and Structural Properties of Alkali-Halide Cluster Anions, July, 1998.

10. J. Deng, Magnetism in Clusters of Chromium and Terbium, August, 1998.

11. A. J. Dally, Dynamics of Alkali-Halide Clusters, August, 2002.

12. J. W. Emmert, Magnetism in Cobalt Clusters, January, 2006.

13. F. W. Payne, Magnetism in Metal Clusters, January, 2007.

14. S. Yi, Energy Distribution in Clusters, January, 2007.

15. Wei Jiang, Magnetic Properties of Free Metal Clusters, January, 2008.

M.S Degrees Awarded:

1. Y. J. Twu, Production and Analysis of Alkali-Halide Clusters, May, 1989.

2. D. B. Haynes, III, Magnetic Studies of Free Terbium Clusters, May, 1992.

3. P. J. Koppers, Deflection Statistics of Warm Anisotropic Magnetic Clusters, December 1995.

4. S. L. Jaiswal, May, 2001.

5. J. Liu, August 2005.

Graduate Students:

1. C. W. C. Conover, June, 1986 to May, 1990,
   Departmental Fellow, Physics Department, University of Virginia.

2. Y. A. Yang, June, 1987 to May, 1991.

3. Y. J. Twu, June, 1988 to May, 1989.

4. D. C. Douglass, June, 1989 to May, 1992,
   Dupont Fellow, University of Virginia.

5. P. Xia, June, 1989 to January, 1993,
   Dupont Fellow, University of Virginia,
   American Chemical Society-Petroleum Research Fund Fellow.

6. D. B. Haynes, June, 1990 to May, 1992.

7. A. J. Cox, June, 1990 to December, 1993,
   President's Fellow, University of Virginia,
   Dupont Fellow, University of Virginia,
   American Chemical Society-Petroleum Research Fund Fellow.

8. J. G. Louderback, June, 1990 to January, 1995,
   President's Fellow, University of Virginia.

9. D. J. Fatemi, June, 1991 to August, 1995,
   American Chemical Society-Petroleum Research Fund Fellow.

10. S. E. Apsel, June, 1992 to May, 1996,
    President's Fellow, University of Virginia.

11. F. K. Fatemi, June, 1994 to July, 1998,
    President’s Fellow, University of Virginia,
    BP-America Fellowship,
    Dissertation Year Fellowship, University of Virginia.

12. J. W. Emmert, June, 1994 to January, 2006,
    Departmental Fellow, Physics Department, University of Virginia.

13. P. J. Koppers, June, 1994 to December, 1995.

14. J. Deng, June, 1995 to August, 1998.

15. H. Zhang, June, 1997 to August, 2002.

16. A. J. Dally, June, 1997 to August, 2002.

17. S. L. Jaiswal, June, 1998 to August, 1999
    Departmental Fellow Physics Department, University of Virginia.

18. S. Ye, October, 2002 to January, 2007.

19. F. Payne, May, 2003 to January, 2007.

20. J. Liu, May, 2003 to August, 2005

21. W. Jiang, May, 2003 to 2008

Undergraduate Students:

1. G. Bishop, January, 1986 to January, 1987.
2. N. G. Phillips, June, 1989 to June, 1990.
3. N. D. Rizzo, June, 1990 to August, 1991.
4. J. T. Moore, September, 1990 to August, 1991.
5. L. J. Lising, June, 1991 to May, 1992.
6. A. Spencer, June, 1992 to August, 1992.
7. E. Caldwell, January, 1997 to May, 1997.
8. C. Pettit, June, 2001 to May, 2002
9. A. Laine, August, 2002 to Present

High School Students:

1. J. Joseph, June, 1991 to August, 1991.
2. J. Malone, November, 1992 to October, 1993.
3. N. Healy, June, 1993 to August, 1993.

Postdoctoral Research Associates:

1. J. P. Bucher, April, 1989 to April, 1991.
2. Nai-Chang Yu, September, 1992.
3. D. J. Fatemi, September, 1995.
4. J. Deng, September, 1998.
5. A. J. Dally, September, 2002 to December, 2002.
6. A. B. Post, September 2006 to June, 2008.

Visitors:

1. J. Eynard, June, 1997 to August, 1997.

FUNDING HISTORY

Past and Current Funding

1. National Science Foundation, Presidential Young Investigator Award, 1986–91, $312K.
2. Jeffress Memorial Trust, 1986–88, $30K.
3. Petroleum Research Fund, 1986–88, $18K.
4. Center for Innovative Technology, 1988–89, $18K.
5. Sloan Foundation, 1989–91, $25K.
6. Office of Naval Research, 1988–91, $390K.
7. Office of Naval Research, 1991–92, $68K/yr.
8. Petroleum Research Fund, 1991–93, $20K/yr.
9. Office of Naval Research, 1992–93, $42K/yr.
10. National Science Foundation, 1992–95, $75K/yr.
11. National Science Foundation, 1995–97, $150K/yr.
12. National Science Foundation, 1998–01, $150K/yr.
13. National Science Foundation, 2001–03, $100K/yr.
14. National Science Foundation, 2004–07, $110K/yr.
15. DARPA/ONR, 2006-2008, $120K.

Funded Collaborations

16. Academic Enhancement Program (with Poon, Shiflet, Jesser, Hsu, and Scully), 1995–98, $300K/yr
17. National Science Foundation IGERT Program (with Harrison and Pate), 2000-2005, $500K/yr.