

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

EDUCATION

Ph.D. Physics, 1983 (Theo W. Hansch, 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 (UVa Honor System), 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

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

PROFESSIONAL ASSOCIATIONS AND ACTIVITIES

Associate Editor, Reviews of Modern Physics
Member of the American Physical Society
Member of 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. **A27**, 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.

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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. B* **38**, 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.* **D20**, 93 (1991).
46. Localization in Small fcc-Particles with Surface Irregularities and Disorder (J. P. Bucher and L. A. Bloomfield), *Z. Phys.* **D20**, 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.* **D20**, 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).
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50. Heisenberg Model of Subdomain fcc-Clusters: a Monte Carlo Study (J. P. Bucher and L. A. Bloomfield), *Phys. Rev.* **B45**, 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.* **B45**, 6341 (1992).
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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.
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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.* **B7**, 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.* **B47**, 12874 (1993).
62. Photoelectron Spectroscopy of Sodium Chloride Anions with Two Excess Electrons (P. Xia, A. J. Cox, and L. A. Bloomfield), *Z. Phys.* **D26**, 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.* **D26**, 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.* **D26**, 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 *4d*-Transition-Metal Clusters (A. J. Cox, J. G. Louderback, S. E. Apsel, and L. A. Bloomfield), *Phys. Rev.* **B49**, 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.* **A54**, 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.* **B55**, 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.
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82. Physics Provides Answers to Common Household Questions (M. Hendrick and L. A. Bloomfield), *USA Today*, June 1, 1999, 7.
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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).
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95. Photoelectron Spectroscopy of Sodium Iodide Clusters Containing Single Hydroxyl Ions or Water Molecules (D. J. Fatemi and L. A. Bloomfield), *Phys. Rev. A* **66**, 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).

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).