

# Curriculum Vita – Dec. 2011

## David V. Baxter

(U.S. Permanent Resident),

Website: <http://www.physics.indiana.edu/~baxter/aboutme.html>

### ***Academic History***

B.Sc. (hon), Physics, University of Alberta, 1979.

M.S., Applied Physics, California Institute of Technology, 1981.

Ph.D., Applied Physics, California Institute of Technology, 1984.

Thesis: Extended X-ray Absorption Fine Structure Studies of La-Ga Metallic Glasses

Advisor: William L. Johnson

Postdoctoral Fellow, Applied Physics and Chemistry, California Institute of Technology, June-Dec. 1984.

Supervisors: John D. Baldeschwieler and William L. Johnson

Postdoctoral Fellow, Physics, McGill University, Jan. 1985-Sept. 1987.

Supervisor: John O. Strom-Olsen

Chester Davis Research Fellow, Physics, Indiana University, Oct. 1987-Aug. 1988.

Professor of Physics, Indiana University, Sept. 1988-present (Full Professor since July 2002).

### ***Scholarships and Awards***

Joseph and Sophia Konopinski Award for teaching by junior faculty, Indiana University Physics Department, September 1992.

Chester Davis Fellowship, Physics Department, Indiana University, 1987-88.

Natural Sciences and Engineering Research Council (NSERC) Post-Doctoral Fellowship, McGill University, 1985-87.

SOHIO Fellowship in Applied Physics, Caltech, 1982-83.

NSERC Post-graduate Fellowships, Caltech, 1979-83.

Queen Elizabeth Scholarships, University of Alberta, 1975-79.

University of Alberta matriculation prize, 1975.

### ***Committee Appointments***

Member: Program Committee of the Midwest Superconductivity Consortium (MISCON), 1992-2000.

### ***Areas of Research***

- Applications of x-ray and neutron scattering to materials problems.
- Development of novel neutron instrumentation.
- Magnetoresistive probes of processes in disordered and multilayered conductors.
- Structure and properties of metastable and nanostructured materials.
- Deposition and properties of thin films made by sputtering and CVD.

## ***Summary of Experience***

### **Research:**

#### **Faculty Member (Indiana University, Sept. 1987-present)**

My general area of interest is in materials physics, particularly studies of the structure and electronic transport studies of metastable and multilayered metallic films. My current research is split between two major efforts: the development of enhanced neutron instrumentation (specifically improved neutron moderators and devices for spin manipulation), and the application of neutron and x-ray scattering techniques to understand the structure and dynamics of materials.

The neutron work takes place at the LENS facility, which has been developed as a prototype university-based pulsed neutron source with funding from the NSF and a variety of other sources.. This facility is the first long-pulsed neutron source built outside of Russia and has a time-averaged intensity comparable first generation pulsed neutron sources (e.g. KENS and IPNS). The facility has instrumentation for SANS studies of a wide variety of materials, a beam line for the development of new neutron instrumentation using spin manipulation and is ideal for the education of future users of neutron techniques. Its design is uniquely suited to the experimental investigation of new concepts in neutron moderation as it is possible to exchange moderators several times within a span of a few weeks without the need for remote handling of components.

In my earlier work in the area of spintronics. we measured the spontaneous resistivity anisotropy in  $\text{Ga}_{1-x}\text{Mn}_x\text{As}$  alloy films as a test of emerging theories of transport in this new class of magnetic conductor. Anisotropy of the magnetoresistance at higher fields is also being measured as a probe of spin disorder in the same materials. We have also studied the temperature dependence of the Hall effect in these materials in order to develop a convenient technique for measuring carrier concentrations in the presence of sizable anomalous Hall effects. In somewhat related work, we have also initiated a collaboration with Lyudmilla Bronstein (IU Chem) investigating the structure and magnetic properties of functionalize magnetic nanoparticles.

My earlier work and on-going collaborations with other researchers have included studies both of low-temperature properties of disordered conductors and thin film growth through both sputtering and chemical vapor deposition. The low-temperature studies have included electronic transport associated with the metal-insulator transition, quantum corrections, and GMR-related phenomena. Growth studies have included experimental investigations of metallic multilayers, electrochromic, and other technologically important materials as well as kinetic Monte Carlo simulations of CVD film morphology.

#### **Post-Doctoral Fellow (McGill University, Jan. 1985-Aug. 1987)**

While at McGill I conducted a number of experiments into the properties of amorphous and icosahedral alloys. Projects included collaborative efforts concerned with the structure and stability of Al based icosahedral phases. This work involved collaborations with workers at the University of Pennsylvania, the CANMET labs in Ottawa, and the Hydro-Quebec labs near Montreal.

A number of investigations of low temperature properties of amorphous alloys were also conducted. These included a collaboration with the University of Montreal which showed clear evidence for the contribution of the “side-jump” anomalous Hall effect in some Zr based glasses by correlating magnetic susceptibility measurements (mine) with Hall measurements (theirs).

Other significant work from this period included studies of the electrical properties of s-p metal alloys using magnetoresistivity measurements. These studies allowed the most rigorous test to date on the ability of Quantum Correction theories (Weak Localization and Enhanced Inter-Electron Interaction) to explain low temperature transport in bulk disordered metallic alloys. They also showed clearly that Maki-Thompson superconducting fluctuations can influence the magnetoresistance of such material remarkably far above  $T_c$  (i.e. at T up to  $50 T_c$ ) in some systems. It was found that the theoretical expressions for these effects are in substantial quantitative agreement with experiment and this was used to develop a technique for measuring a sample's resistivity in a manner which is independent of its geometry. This technique was applied to icosahedral alloys, where problems with sample geometry had previously limited severely the accuracy of resistivity measurements. This work showed clearly the importance of using samples with very small concentrations of magnetic impurities when studying WL effects in bulk metallic systems.

### **Post-Doctoral Fellow (Caltech, Jun.-Dec. 1984)**

During this time I worked with a group constructing a Scanning Tunneling Microscopy (STM), designing a UHV sample preparation chamber and initiating *ab initio* calculations of electron transfer between simple molecular systems. Such calculations laid the ground work for more sophisticated modeling of the tunneling process, by allowing more realistic treatment of the tunneling tip than was commonly used in the early theories of the STM.

### **Graduate Research**

My graduate research involved a careful study of the utility of X-ray Absorption (EXAFS) measurements as a probe of the local atomic structure in amorphous metals. This work was performed on an “in-house” spectrometer, and provided a clear indication of the limitations of this technique when applied to disordered systems. The thesis also included some unpublished work on a nonparametric inversion technique for EXAFS analysis.

### **Teaching:**

I have taught courses at all undergraduate levels, ranging from a 100 level survey course for humanities majors, to graduate courses in Statistical Mechanics and Solid State Physics. I have taught the large algebra-based introductory physics course commonly taken by pre-medical students and others interested in professional degrees. Other courses taught include a two semester senior level course in Quantum Mechanics and a senior level lab

### **Professional Affiliations**

I am a member of the American Physical Society, and the Neutron Scattering Society of America.

## **Students Supervised**

### **Ph.D. Students:**

#### **Student**

Paul Davids (Ph.D., 1993)  
Nana Fadnis (Ph.D., 1995)  
Wen-Chung Chiang (Ph.D., 1995)  
Martine Kalke (Ph.D., 2002)  
Dmitry Ruzmetov (Ph.D., July 2003)  
Dan Hussey (PhD, Jan. 2004)  
Chris Lavelle (PhD, Jan. 2007)  
Nicholas Remmes (PhD, Nov. 2007)

#### **Subsequent or current position**

Intel  
Inst. Sci. Info.  
Taiwan Cultural University (Fac.)  
MIT Lincoln Lab Staff member  
Post Doc. Harvard Univ. 2006  
Member of tech. staff at NCNR, NIST MD.  
Now a PDF in Nucl. Phys. IUB  
Post-Doc. in Med. Phys. at Mayo Clinic

### **M.S. Students**

#### **Student**

Shankar Swamy (M.S., 1989)  
Yadong Wang (M.S., 1989)  
Mark Thomas (M.S., 1990)  
Qingzhe Wen (M.S., 1991)  
Cynthia Smotzer (M.S., 1992)  
Leonid Aksenov (M.S., 1993)  
Coe Minear (M.S., 1994)  
Yuhong Mao (M.S., 1994)  
Tom McCaughey (M.S., 1995)  
Julia Scherschligt (M.S. 2004)

#### **Subsequent or current position**

Computer programmer  
CS at W. Wisconsin  
MD practicing in Indiana (now deceased)  
Mat. Sci. UCSB  
Computer systems manager  
Returned to Russia  
Secure Computing Corp., Minneapolis, MN  
EE program at Carnegie Mellon  
EE program at Purdue  
Member of Technical staff at NCNR, NIST MD.

### **Undergraduate Research Students**

#### **Student**

Richard Swartz (B.S., 1996)  
Michael Herrold (B.S., 1996)  
Darius Torchinsky (B.S., 1999)  
Chris Keslin (B.S., 2000)  
Keith Crawley (B.S., 2003)

#### **Subsequent or current position**

Grad. Physics at Stanford  
Peace Corps  
Grad. Physics at MIT  
Computer consultant  
Uncertain  
IU, Biophysics  
Currently in the group  
Currently in the group

### **Invited Conference Talks/Review Panels**

1. "Low Temperature Transport in Glassy and Icosahedral Simple Metal Alloys", **David V. Baxter**, R. Richter, and J. O. Strom-Olsen, presented at the Canadian Association of Physicists Congress, Toronto, Canada, June, 1987.
2. "Anisotropic Electron Transport in Metallic Multilayers", A. N. Fadnis, and **David V. Baxter**, presented (by my student, Fadnis) at the NATO workshop on Nanophase and Nanocomposite Materials, Corfu, Greece, June, 1993.

3. “Perpendicular Magnetotransport and Spin Relaxation in Metallic Multilayers”, 4th Annual Workshop on Magnetic Multilayers, Thin Films, and Mesoscopic Systems, Michigan State University, East Lansing, MI, 7 Nov. 1998.
4. “Measuring Electron-Spin Relaxation in Layered Metallic Structures”, **David V. Baxter**, APS general meeting, Minneapolis, MN, 20 Mar. 2000.
5. “Member: DOE review team for Materials Physics/Chemistry at Sandia National Lab”, Albuquerque, NM, 1-2 Nov. 2000.
6. “Anisotropic Magnetoresistance in Ferromagnetic  $Ga_{1-x}Mn_xAs$ ”, 7th Workshop on Spin Transport and Nanomagnetism, Michigan State University, East Lansing, MI, 22 Sept. 2001.
7. “University-based Pulsed Neutron Sources: the LENS project”, American Conference on Neutron Scattering, Knoxville, TN, 25 June 2002.
8. “New Opportunities in Neutron Education: Local Sources and Novel Instrumentation”, NSF Conference on Neutron Scattering for Chemistry and the Chemistry/Biology Interface, Tallahassee, FL, 23 Sept. 2003.
9. Member: NSF IMR/MRI review panel on beamline instrumentation, Arlington, VA, 28, 29 April, 2004.
10. “Pulsed Neutron Sources from Low Energy Proton Beams,” IAEA technical meeting on small and medium Accelerator Driven Neutron Sources, Vienna Austria, 18-21 May 2004.
11. “Status of the Low Energy Neutron Source at Indiana University,” Conference on the Application of Accelerators in Research and Industry (CAARI), Ft. Worth TX, 11 Oct. 2004.
12. “The Low Energy Neutron Source—Status and Prospects,” 17<sup>th</sup> Meeting of the International Collaboration on Advanced Neutron Sources (ICANS), Santa Fe, NM, 28 April, 2005.
13. “Current Status and Neutronics of the LENS facility,” Workshop on small Accelerator Driven Neutron Source, Hokkaido University, Sapporo Japan, 10 Jan, 2006
14. “The Low Energy Neutron Source at IUCF: Design and Instrumentation”, American Conference on Neutron Scattering, 19 June 2006, St. Charles IL.
15. “Development of Very Cold Neutron Moderator Materials at the Low Energy Neutron Source”, IAEA Research Coordination Meeting on Small and Medium Scale Spallation Neutron Sources, Hokkaido University, Sapporo, Japan, 23 July, 2007.
16. “Lessons Learned from the Neutronic Design of the Low Energy Neutron Source at Indiana University,” First International Workshop on Compact Pulsed Hadron Sources, Tsinghua University, Beijing China, 1 June, 2009
17. “Materials Research Opportunities at Small Pulsed Neutron Sources” 21<sup>st</sup> Annual Magnetism Conference/Cross-Strait Conf. on Magnetism, Taiwan, 25 June 2009
18. “Small Pulsed Neutron Sources and Centers for Science and Innovation”, International Conference on X-ray and Neutron Scattering, Kuala Lumpur, Malaysia, 30 June, 2009.
19. “Recent Developments with Very Cold Neutron Moderation at the Low Energy Neutron Source”, IAEA Research Coordination Meeting on Small and Medium Scale Spallation Neutron Sources, Kuala Lumpur, Malaysia, 2 July, 2009.
20. “Neutron Moderator Studies at the Low Energy Neutron Source”, Inaugural Conference of the Union of Compact Accelerator-Driven Neutron Sources-I, Beijing China, 16 Aug. 2010.

21. “Moderators at LENS: Performance and Development Research”, David V. Baxter et al., Union of Compact Accelerator-driven Neutron Sources-II, Bloomington, IN, 6 July, 2011.
22. “Innovative concepts in Cold Neutron Moderation and Science at Small Neutron Sources”, David V. Baxter, First NANO collaboration meeting, Kolkata India, 21 July 2011.

### ***Invited Seminars and Colloquia***

1. (S) “Extended X-ray Absorption Fine Structure (EXAFS) Studies of Disordered Metallic Alloys”, SOHIO Research Labs, Warren Heights OH, April 1983.
2. (S) “EXAFS Studies of Metallic Glasses”, Kodak Research Labs, Rochester N.Y., June 1983.
3. (S) “EXAFS Studies of La-Ga Metallic Glasses”, Neutron Scattering Group, Los Alamos National Lab, Los Alamos, NM, 13 Dec. 1983.
4. (S) “EXAFS Studies of La-Ga Metallic Glasses”, Physics Division, General Motors Research Labs, Warren, MI, 3 July, 1984.
5. (S) “EXAFS Studies of La-Ga Metallic Glasses”, Physics Department, McGill University, Montreal PQ, 4 July, 1984.
6. (S) “Scanning Tunneling Microscopy”, Physics Department, McGill University, Montreal PQ, 17 April, 1985.
7. (S) “Scanning Tunneling Microscopy”, Physics Department, University of Montreal, Montreal PQ, 18 Nov. 1985.
8. (S) “Structure and Properties of Icosahedral Phases”, Department of Physics, Waterloo University, Waterloo Ont., 19 Sept. 1986.
9. (S) “Structure and Properties of Icosahedral Phases”, Department of Materials Science, McMaster University, Hamilton Ont., 19 Sept. 1986.
10. (S) “Quantum Corrections to Conduction in Disordered Metallic Alloys”, Department of Physics, Texas A&M University, College Station Texas, 28 Jan. 1987.
11. (S) “Quantum Corrections to Conduction in Disordered Metallic Alloys”, Department of Physics, Indiana University Bloomington IN, 20 Feb. 1987.
12. (S) “Structure and Properties of Icosahedral Phases”, Physics Department, University of Montreal, Montreal PQ, 17 Mar. 1987.
13. (S) “Structure and Properties of Icosahedral Phases”, Physical Metallurgy Department, CANMET, Ottawa Ont., 29 April, 1987.
14. (C) “Formation and Properties of Rapidly Quenched Metallic Alloys”, Physics Department, University of Alberta, Edmonton Alta., 12 May 1987.
15. (S) “Low Temperature Transport in Disordered Metallic Alloys”, Physics Department, University of Alberta, Edmonton Alta., 13 May 1987.
16. (S) “Low Temperature Transport in Disordered Metallic Alloys”, Physics Department, University of Maine, Orono Maine, 3 June 1987.
17. (S) “Low Temperature Transport in Simple Metallic Glasses”, Physics Department, Indiana University, Bloomington IN, 21 April, 1988.
18. (S) “Low Temperature Transport in Glassy and Icosahedral Metallic Alloys”, Physics Department, University of Kentucky, Lexington KY, 1 Nov. 1988.

19. (C) "Electrons in Disordered Media: Quantum Diffusion", Physics Department, Indiana State University, Terre Haute, IN, 18 Oct. 1989.
20. (S) "Weak Localization in Metallic Glasses and Multilayers.", Physics Department, University of Delaware, Newark, DE, 20 Nov. 1990.
21. (S) "The Materials Science of YBCO Superconductors", Chemistry Department, Indiana University, Bloomington, IN, 17 Dec. 1991.
22. (S) "Metallic Multilayers: Materials Science on the Atomic Scale", Physics Department, Purdue University, West Lafayette, Oct. 9, 1992.
23. (C) "Metallic Multilayers: Materials Science on an Atomic Scale", Physics Department, IUPUI, Indianapolis, Nov. 5, 1992.
24. (S) "Metallic Multilayers: Materials Science on an Atomic Scale", General Motors Research and Development Labs, Warren MI, Mar. 15, 1993.
25. (C) "Materials Science on an Atomic Scale: An Introduction to the World of Nanostructured materials", Physics Department, Indiana University, Bloomington, IN, Sept. 9, 1993.
26. (S) "Synthesis and Properties of Nanostructured Materials", Chemistry Department, Indiana University, 1 Nov. 1994.
27. (S) "Anisotropic Transport and Superconductivity in Metal/Semiconductor Multilayers", Physics Department, University of Nebraska, 28 April, 1995.
28. (S) "Perpendicular Current Studies of Giant Magnetoresistance and Spin Relaxation in Layered Metallic Structures", Physics Department, Indiana University, Bloomington, IN, 18 Sept., 1998.
29. (S) "Perpendicular Magnetotransport and Spin Relaxation in Layered Metallic Structures", Physics Department, University of Delaware, Newark, DE, 16 Mar., 1999.
30. (C) "Perpendicular Magnetotransport and Spin Relaxation in Layered Metallic Structures", Physics Department, Indiana University Purdue University, Indianapolis, IN, 1 Apr., 1999.
31. (S) "Perpendicular Magnetotransport and Spin Relaxation in Layered Metallic Structures", Physics Department, Northwestern University, Evanston, IL, 4 Nov., 1999.
32. (S) "Interface Resistance and Spin Relaxation in Layered Metallic Structures", Physics Department, University of Notre Dame, South Bend, IN, 16 Mar., 2000.
33. (C) "(What the heck is) Spintronics?", Physics Department, Indiana University, Bloomington, IN, 12 Apr., 2000.
34. (S) "Anisotropic Magnetoresistance in  $Ga_{1-x}Mn_xAs$ ", Physics Department, University of Texas, Austin, 23 Oct., 2001.
35. (C) "The LENS project at Indiana University", Interfaculty Reactor Institute, Technical University of Delft, Delft, Netherlands, 29 May 2002.
36. (S) "The LENS Project – Neutrons at Bargain-Basement Prices", Condensed Matter Physics Seminar, Indiana University, 7 Sept. 2002.
37. (C) "Materials Research at a University-based Pulsed Neutron Source", Chemical and Materials Engineering Colloquium, University of Cincinnati, 21 Feb. 2003.
38. (S) "LENS – A Low Energy Neutron Source for Research and Education", Nuclear Engineering seminar, Purdue University, 24 Mar. 2003.
39. (S) "LENS – What is it and what can it do for me?", Nuclear Physics seminar, Indiana University, 5 Sept. 2003.

40. (S) “LENS – A University-based Pulsed Neutron Source for Research and Education”, Physics seminar, University of Missouri, 8 Oct. 2003.
41. (S) “LENS—A new resource for Materials Research at IUB,” Chemistry Department, Indiana University, inaugural materials research seminar, 16 Jan. 2004.
42. (C) “The Low Energy Neutron Source in Bloomington,” Physics Dept. Colloquium, Ball State University, Muncie, IN, 4 Nov. 2004.
43. (S) “The Low energy Neutron Source at IUCF”, Dept. of Physics, Condensed Matter seminar, Texas A&M University, College Station TX, 21 Sept. 2005.
44. (C) “The Low Energy Neutron Source—Recent progress and future opportunities” Physics Dept. Colloquium, Indiana University, Bloomington, IN, 19 Sept. 2007.
45. (C) “The Low Energy Neutron Source—A Regional Resource for Materials Research.” Physics Dept. Colloquium, Indiana University Purdue University, Indianapolis, IN, 1 Nov., 2007.
46. (S) “LENS at Indiana University: A Regional Resource for Materials Research,” Condensed Matter Physics seminar, University of Notre Dame, 16, April 2009
47. (C) “Novel probes of material structure and dynamics at IU’s CEEM”, D. V. Baxter, Geological Sciences Colloquium, 25 Oct. 2010.
48. (S) “Development of novel neutron scintillation materials using a combinatorial approach and LENS”, David V. Baxter, CEEM seminar 15 July, 2011.

### ***Contributed Talks***

Since 2005, I, my students, or our collaborators have given approximately 15 contributed presentations at national or regional meetings for which there was no accompanying paper. These talks have been given at the annual American Physical Society March meetings, National and International conferences on neutron scattering, and at various meetings of the American Chemical Society, In all cases the results presented have been published in one of the papers listed in the following section.

### ***Publications of David V. Baxter***

#### **Refereed Journals**

- J-1. “EXAFS Studies of the Metallic Glass  $\text{La}_{80}\text{Ga}_{20}$ ”, **David V. Baxter**, Art Williams and W. L. Johnson, *J. Non-Cryst. Solids* **61&62**, 409-414 (1984).
- J-2. “EXAFS Studies of  $\text{La}_{1-x}\text{Ga}_x$  Metallic Glasses”, **David V. Baxter**, *J. Non-Cryst. Solids*, **79**, 41-55 (1986).
- J-3. “Chemical Applications of Scanning Tunneling Microscopy”, Paul West, John Kramer, **David V. Baxter**, Robert J. Cave, and John D. Baldeschwieler, *IBM J. of Res. and Devel.*, **30**, 484-490 (1986).
- J-4. “Electrical Resistivity of Icosahedral Mg-Al-Zn Alloys”, **David V. Baxter**, R. Richter, and J. O. Strom-Olsen, *Phys. Rev.* **B35**, 4819-4822 (1987).
- J-5. “Theoretical Studies of Electron Transfer in Metal Dimers”, Robert J. Cave, **David V. Baxter**, William A. Goddard and John D. Baldeschwieler, *J. Chem. Phys.* **87**, 926-935 (1987).

- J-6. “Weak Localization in 2 and 3 Dimensions: Dephasing by Zero Point Motion”, N. Kumar, **David V. Baxter**, R. Richter, and J. O. Strom-Olsen, Phys. Rev. Lett. **59**, 1853-5 (1987). See also comments and reply: Phys. Rev. Lett. **60**, 1985-87 (1988).
- J-7. “Positive Hall Effect in Paramagnetic Amorphous Zr-Fe”, M. Trudeau, R. W. Cochrane, **David V. Baxter**, and J. O. Strom-Olsen, Phys. Rev. **B37**, 4499-4501 (1988).
- J-8. “Crystallization of Icosahedral Al-Mn-Si”, **David V. Baxter**, R. Schulz, J. O. Strom-Olsen, and G. J. C. Carpenter, Mat. Sci. and Eng. **99**, 399 (1988).
- J-9. “Structure of Quasicrystalline Al-Mn-Ru: X-ray and Neutron Studies”, W. Dmowski, P. A. Bancel, T. Egami, P. A. Heiney, **David V. Baxter**, and J. A. Leake, Mat. Sci. and Eng. **99**, 349 (1988).
- J-10. “Quantum Corrections to the Conductivity in  $Mg_{70}Cu_{30-x}Au_x$   $x = 0,1,3,9$  and  $Mg_{70}Zn_{30-x}Au_x$   $x = 0,3$ ”, R. Richter, **David V. Baxter**, and J. O. Strom-Olsen, Mat. Sci. and Eng. **99**, 187 (1988).
- J-11. “Quantum Corrections to the Conductivity in Mg-based Metallic Glasses”, R. Richter, **David V. Baxter**, and J. O. Strom-Olsen, Phys. Rev. **B38**, 10421 (1988).
- J-12. “Fitting to Magnetoresistivity Under Weak Localization in Three Dimensions”, **David V. Baxter**, R. Richter, M. Trudeau, R. W. Cochrane, and J. O. Strom-Olsen, J. de Physique **50**, 1673 (1989).
- J-13. “Limits to Weak Localization in  $Ca_{70}Mg_{30-x}Al_x$ ”, **David V. Baxter**, A. N. Fadnis, and A. Sahnoune, Mat. Sci. and Eng. **A133**, 90 (1991).
- J-14. “ $M_2(OR)_6$  Compounds (M-Al, Mo, W; R- t-Bu and cy-Hex) as single source Precursors. Studies of Thermolyses Under He Flow”, **David V. Baxter**, M. Chisholm, V. DiStasi, and J. Klang, Chemistry of Materials, **3**, 221 (1991).
- J-15. “High Frequency Magnetoconductivity of Disordered Copper Films”, Gamini U. Sumanasekera, Bruce D. Williams, **David V. Baxter**, and John P. Carini, Sol. St. Comm., **85**, 941-4 (1993).
- J-16. “Anisotropic Electron Diffusion and Weak Localization in Cu/Al Multilayers”, A. N. Fadnis, M. L. Trudeau, A. Joly, and **David V. Baxter**, Phys. Rev. **B48**, 12202 (1993).
- J-17. “Low Angle X-ray Diffraction with *in situ* Annealing: Application to W/Cu Multilayers”, Wen-Chung Chiang, and **David V. Baxter**, J. Appl. Phys. **74**, 4331 (1993).
- J-18. “Multiple Bonds Between Metal Atoms in Ordered Assemblies II. Quadruple Bonds in the Mesomorphic State”, **David V. Baxter**, Roger H. Cayton, Malcolm H. Chisholm, Elena F. Putilina, Sandra L. Tagg, Joseph W. Zwanziger and Frank D. Darrington, J. Am. Chem. Soc. **116**, 4551-66 (1994).
- J-19. “Synthesis and Thermal and Hydrolytic Conversion of Heterometallic Copper Oxo-Alkoxides”, John. A. Samuels, Wen-Chung Chiang, John C. Huffman, William E. Hatfield, **David V. Baxter**, and Kenneth G. Caulton, Inorg. Chem. **33**, 2167-79 (1994).
- J-20. “Effects of Weak Localization and Superconducting Fluctuations on the Frequency Dependence of the Conductivity in Copper-Germanium Sandwiches”, Gamini U. Sumanasekera, Bruce D. Williams, **David V. Baxter**, and John P. Carini, Phys. Rev. **B50**, 2606-2621 (1994).
- J-21. “Superconductivity in Layered Ge/Cu Films”, **David V. Baxter**, Leonid Aksenov, H. P. Wei, Nanostructured Materials **6**, 811-814 (1995).

- J-22. "Chemical Vapor Deposition of Metal Fluorides from Sodium and Zirconium Fluoroalkoxides", John A. Samuels, Wen-Chung Chiang, Chung P. Yum, **David V. Baxter**, and Kenneth G. Caulton, *Chem. Mater.* **6**, 1684-1692 (1994).
- J-23. "Structure and Stability of Sputter Deposited Beta-Tungsten Thin Films", I. Weerasekera, I. Shah, **David V. Baxter**, Karl M. Unruh, *Appl. Phys. Lett.* **64**, 3231-33 (1994). <http://dx.doi.org/10.1063/1.111318>
- J-24. "Molecular Routes for the Synthesis of Metal-Carbides, -Nitrides, and -Oxides. 1. Studies of Thermal Decomposition of  $M_2(OR)_6$  and  $M_2(CH_2Ph)_2(OR)_4$  Compounds Where  $M = Mo$  and  $W$ ", **David V. Baxter**, Malcolm H. Chisholm, Vincent F. DiStasi, and Scott T. Haubrich, *Chem. Mat.* **7**, 84-92 (1995). <http://dx.doi.org/10.1021/cm00049a014>
- J-25. "Mechanistic Role of  $H_2O$  and the Ligand in the Chemical Vapor Deposition of Cu,  $Cu_2O$ ,  $CuO$  and  $Cu_3N$  from Bis-(1,1,1,5,5,5-hexafluoropentane-2,4-dionato)Copper(II)", Jiri Pinkas, John C. Huffman, **David V. Baxter**, Malcolm H. Chisholm, and Ken G. Caulton, *Chem. Mat.* **7**, 1589-96 (1995). <http://dx.doi.org/10.1021/cm00056a028>
- J-26. "Low Pressure Chemical Vapor Deposition of Metallic Films of Iron, Manganese, Cobalt, Copper, Germanium and Tin Employing Bis(trimethyl)silylamido Complexes  $M(N(SiMe_3)_2)_2$ ", **David V. Baxter**, M. H. Chisholm, G. J. Gama, A. L. Hector, I. P. Parkin, *Chem. Vap. Deposition* **1**, 49-51 (1995).
- J-27. "Measuring Transport Anisotropy in Cu/Si Multilayers Using Weak Localization", A. N. Fadnis and **David V. Baxter**, *J. Phys. Condens. Matter*, **8**, 1389-1401 (1996).
- J-28. "Molecular Routes for the Synthesis of Metal Carbides, Nitrides, and Oxides. 2. Studies of the Ammonolysis of Metal Dialkylamides and Silylamides", **David V. Baxter**, Malcolm H. Chisholm, Gennaro J. Gama, Vincent F. DiStasi, Andrew L. Hector, and Ivan P. Parkin, *Chem. Mater.* **8**, 1222-1228 (1996).
- J-29. "Transport Anisotropy and Dimensional Crossover in Ag/Ge Multilayers", **David V. Baxter**, Gamini U. Sumanasekera, and John P. Carini, *J. Magn. Magn. Mat.* **156**, 359-361 (1996). [http://dx.doi.org/10.1016/0304-8853\(95\)00898-5](http://dx.doi.org/10.1016/0304-8853(95)00898-5)
- J-30. "Conductivity Studies of Quantum-Critical Dynamics", John P. Carini, H. L. Lee, and David V. Baxter, *Ferroelectrics*, **176**, 239-47 (1996).
- J-31. "Chemical Vapor Deposition of Electrochromic Tungsten Oxide Films Employing Volatile Tungsten(6+) Oxo Alkoxide/ $\beta$ -diketonate Complexes", **David V. Baxter** Malcolm H. Chisholm, Simon Doherty, and Nadine E. Gruhn. *Chem. Comm.* **1996** 1129-1130. <http://dx.doi.org/10.1039/CC9960001129>
- J-32. "Spin Fluctuations in an Amorphous Alloy", A. LeR. Dawson, D. H. Ryan, and **David V. Baxter**, *Phys. Rev.* **B54**, 12238-12244 (1996). <http://dx.doi.org/10.1103/PhysRevB.54.12238>
- J-33. "Synthesis, Structures and Thermal Behavior of Cu(hfacac) Complexes Derived from Ethanolamines", J. Pinkas, J. C. Huffman, J. C. Bollinger, W. E. Streib, **David V. Baxter**, M. H. Chisholm, and K. G. Caulton, *Inorg. Chem.* **36**, 2930-37 (1997).
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- C-6. “Giant Magnetoresistance and Oscillation in Epitaxial Fe/Cr(111) Multilayers” Wen-C. Chiang, **David V. Baxter**, and Yang-Tse Cheng, in “Magnetic Ultrathin Films

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- C-24. “In-situ Polarized <sup>3</sup>He-base Neutron Polarization Analyzer for SNS Magnetism Reflectometer”, W-T Lee<sup>1</sup>, X Tong<sup>1</sup>, J Pierce<sup>1</sup>, M Fleenor<sup>1</sup>, A Ismaili<sup>1</sup>, J L Robertson<sup>1</sup>, W-C Chen<sup>2</sup>, T Gentile<sup>2</sup>, A Hailemariam<sup>1</sup>, R Goyette<sup>1</sup>, A A Parizzi<sup>1</sup>, V Lauter<sup>1</sup>, F klose<sup>3</sup>, H Kaiser<sup>4</sup>, C Lavelle<sup>4</sup>, D V Baxter<sup>4</sup>, G J Jones<sup>5</sup> and L W McCollum<sup>1</sup>, International Conference on Neutron Scattering, Knoxville, TN 3-7 May 2009.
- C-25. “Total Cross section measurements of H<sub>2</sub>O and ZrH<sub>2</sub> with Very Cold Neutrons,” David V. Baxter, H. Kaiser, J. Leung, G. Muhrer, and M. Hartl, and E. B. Iverson, Proceedings of the 19<sup>th</sup> meeting of the International Collaboration on Advanced Neutron Sources, Grindelwald Switzerland, March, 2010.
- C-26. “Neutron Moderator Development Research at the Low Energy Neutron Source”, D. V. Baxter, J. Leung, H. Kaiser, G. Muhrer, E. B. Iverson, and P. D. Ferguson, accepted for publication in Physics Procedia, Dec. 2011.

### ***Competitively Obtained Funding***

- G-1. “Electronic Transport in Amorphous and Multilayered Metallic Thin Films”, NSF (DMR-89-18139), **\$158,000** (8 Aug. 1990 to 31 Jul. 1993).

- G-2. “Low Temperature Routes to Processing of High-Temperature Superconductors” with K.G. Caulton and M.H. Chisholm, MISCON (DOE #DE-FG02-90ER45427), **\$422,600** (24 Jul. 1991 to 23 Jul. 1995).
- G-3. “High Temperature X-ray Diffraction Facility for Material Research” with M.H. Chisholm and K.G. Caulton, Indiana University Research Facilities Fund Competition (IU-RFF), **\$172,500** (2 Oct. 1991) — equipment purchase.
- G-4. “Chemical Vapor Deposition (CVD) Facility for Producing of High  $T_c$  Superconducting Films” with M.H. Chisholm and K.G. Caulton, MISCON Equip. Competition, **\$96,425** (1 Nov. 1991) — equipment construction.
- G-5. “Chemical Control of Materials Synthesis through Molecular Precursor Design” with K.G. Caulton and M.H. Chisholm, NSF (CHE-9119067), **\$211,000** (1 May 1992 to 31 Jan. 1995).
- G-6. “Electronic Transport in Amorphous and Multilayered Metallic Thin Films – Supplementary Award”, NSF (DMR-89-18139), **\$10,000** (1 Aug. 1993 to 31 Dec. 1993).
- G-7. “Effect of Interface Structure on Transport Properties of Metallic Multilayers”, NSF, (DMR93-14018) **\$240,000**, (1 Jan. 1994 to 31 Dec., 1996).
- G-8. “REU supplement request for NSF grant DMR93-14018,” NSF, **\$5,000** to support an undergraduate researcher from 20 May 1994 to 20 Aug. 1994.
- G-9. “Photolithographic Facility– A Contribution to the Educational Infrastructure at IU”, H. P. Wei, D. V. Baxter, J. P. Carini, K. G. Caulton, M. H. Chisholm, J. Mills and K Solberg, IU-RFF equipment award, **\$250,000** November 1994.
- G-10. “Fundamental Studies of CVD Film Growth for High-Temperature Superconductors” with K.G. Caulton and M.H. Chisholm, MISCON (DOE #DE-FG02-90ER45427), **\$475,159** (23 Jul. 1995 to 24 Jul. 2001).
- G-11. “Scanning Electron Microscope Equipment Grant”, National Institutes of Health, with 14 other investigators led by Bill Sexton, equipment award, Dec. 1997, **\$194,000**.
- G-12. “Spin-Polarized Electron Transport Facility”, with J. P. Carini, IU RFF fund equipment award, July 1999, **\$30,000**.
- G-13. “Semiconductor Spintronics: Fundamental Studies of Growth and Materials Properties”, D. V. Baxter, A. H. MacDonald, J. Furdyna, M. Dobrowolska, P. Shiffer, B. Bunker, S. Ruggiero, Indiana 21st Century Science and Technology Fund, May. 2000 to Jun. 2003, **\$511,634**.
- G-14. “Atomic Force Microscopy Facility for Imaging Magnetic and Biological Materials,” D. V. Baxter, J. X. Tang, G. Christou, Y. Brun, D. Daleke, and A. Gavrin, IU RIF competition equipment award, May 2000, **\$150,000**.
- G-15. “Spintronics and Spin-Photonics in Ferromagnetic InAs/GaSb-Based Heterostructures,” B. D. McCombe (Buffalo) and 19 other investigators from 7 institutions (D. V. Baxter and A. H. MacDonald at IU), 1 Oct. 2000 through 30 Jan. 2004, DARPA, **\$509,366** for IU, \$6.1M in total.
- G-16. “Development of a Low Energy Neutron Scattering Facility: Interim Funding request”, David V. Baxter, J. M. Cameron, H. Nann, W. M. Snow, and J. W. Zwanziger, **\$150,000**, NSF, Jan. 2003-Dec., 2004.
- G-17. “Development of a Low Energy Neutron Scattering Facility”, David V. Baxter, J. M. Cameron, H. Nann, W. M. Snow, and J. W. Zwanziger, and others, **~\$7.3M**, NSF, Sept. 2003- Dec. 2008 (including IU matching funds).

- G-18. “Development of a Low Energy Neutron Scattering Facility”, David V. Baxter, J. M. Cameron, H. Nann, W. M. Snow, and J. W. Zwanziger, **\$2.4M**, Feb. 2004- Dec.2008, Indiana 21st Century Science and Technology Fund (including IU matching funds).
- G-19. “Development of Detectors for Neutron Radiography and Stress Analysis”, Special State Research Fund, Indiana University, J. M. Cameron, D. V. Baxter, H. O. Meyer, **\$290,000**, June 2004-May 2006.
- G-20. “Research and Development Leading to the Establishment of a Combined Environments Radiation Effects Simulator,” Missile Defense Agency, with NAVSEA CRANE, and several researchers at IUCF, **\$4.1M**, March 2004 thru Dec. 2008.
- G-21. “A Neutron Scattering Sample Support Laboratory for LENS,” State Research Fund, Indiana University, D. V. Baxter, D. Bossev, R. Pynn, W. M. Snow, P. E. Sokol, **\$369,000**, June 2005-May 2007.
- G-22. “The NCNR/LENS Partnership in Neutron Scattering,” Dept. of Commerce, 1 Sept. 2005, 31 Aug 2010, **\$2.8M**.
- G-23. “Partial support for the Eighth International Conference on Quasi-Elastic Neutron Scattering (QENS 2006) in Bloomington, IN”, NSF, with D. Bossev, P. E. Sokol, H. Kaiser, and R. Pynn June 2006, **\$15K**
- G-24. “Development of Very Cold Moderator Materials at the Low Energy Neutron Source,” D. Baxter, W. M. Snow, IAEA, **\$15,972**, for participation in CRP 5.1.20.21, Dec. 2006-Dec. 2009
- G-25. “Studies of Advanced moderator concepts and improvements proposed for the SNS target system”, D. V.Baxter, E. B. Iverson, P. D. Fergusson, DOE, 20 May 2008, 31 Dec. 2011; **\$302,000**
- G-26. “Development of Cold and Very Cold Pelletized moderators for pulsed neutron Sources: Phase I,” C. F. Foster, D. V. Baxter, W. M. Snow, P. E. Sokol, STTR/DOE, **\$40K**, Jan. 2009 – Aug. 2011.
- G-27. “Development of Cold and Very Cold Pelletized moderators for pulsed neutron Sources: Phase II,” C. F. Foster, D. V. Baxter, STTR/DOE, **\$330K**, Aug.. 2009 – Aug. 2011
- G-28. “IMR-MIP: Advanced Neutron Spin Manipulation Technology, with R. Pynn, and W. M. Snow, Sept 2010- Aug 2012, **\$1.05M**.
- G-29. “LDRD supported research on vaned neutron moderators”, DOE, **\$120K** 30-Oct. 2010 30-Oct. 2012.

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