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Research Interests:

- Application of nanotechnology to create novel permanent magnets (spring magnets)
- Laterally confined nanomagnets
- Development of magnetic electronics
- Bio-inspired self-assembly of magnetic nanostructures
- Magnetic surfaces, films, wedges and superlattices, including hybrid structures, such as novel ferromagnetic-superconducting multilayers
- Giant magnetoresistance and exchange-coupled magnetic multilayers
- Colossal magnetoresistance in naturally layered manganites

Experimental Research Areas:

Surface Magnetism; Metal-on-Metal Epitaxy; Magneto-Optics;
Surface Physics; Electron Spectroscopies; Superconductivity;
Synchrotron-Radiation Instrumentation; Magnetism;
(Neutron Scattering; Lattice Dynamics; Low-Temperature Physics)

Selected Recent Publications:

Metal-insulator transition and its relation to magnetic structure in $(\text{LaMnO}_3)_{2n}/(\text{SrMnO}_3)_n$ superlattices, A. Bhattacharya, S. G. E. te Velthuis, M. Warusawithana, J. J. Kavich, X. Zhai, B. Jiang, J. Zou, M. R. Fitzsimmons⁶, J. W. Freeland, S. D. Bader, and J. N. Eckstein, Phys. Rev. Lett. 100, 257203 (27 June, 2008)

Viscous Spin Exchange Torque on Precessional Magnetization in $(\text{LaMnO}_3)_{2n}/(\text{SrMnO}_3)_n$ Superlattices, H.B. Zhao, K.J. Smith, Y. Fan, G. Lüpke, A. Bhattacharya, S.D. Bader, M. Warusawithana, X. Zhai, and J.N. Eckstein, Phys. Rev. Lett. 100, 117208 (21 March, 2008)

Absence of Spin Transport in the Organic Semiconductor Alq_3 , J. S. Jiang, J. E. Pearson, S. D. Bader, Phys. Rev. B77, 035303 (Jan. 2008) pp. 1-7, Virtual Journal of Nanoscale Science & Technology, Jan. 14, 2008

Strong Surface Magnetic Anisotropy of Ultrathin Fe on Curved Pt(111), Ruihua Cheng, S.D. Bader, F.Y. Fradin, Phys. Rev. B 77, 024404 (Jan. 2008) pp. 1-6, Virtual Journal of Nanoscale Science & Technology, Jan. 14, 2008

Asymmetric Ferromagnet-Superconductor-Ferromagnet Switch, P. Cadden-Zimansky, Ya. Bazaliy, L.M. Litvak, J.S. Jiang, J.Y. Gu, C.-Y. You, M.R. Beasley, and S.D. Bader, Phys. Rev. B 77, 184501 (May 1, 2008)

High-Energy Phonon Confinement in Nanoscale Metallic Multilayers, Beatriz Roldan Cuenya, W. Keune, R. Peters, E. Schuster, B. Sahoo, U. von Hörsten, W. Sturhahn, J. Zhao, T.S. Toellner, E.E. Alp, and S.D. Bader, Phys. Rev. B 77, 165410 (April, 2008)

Net Ferromagnetic Mn moment due to canted spins at SrRuO₃/SrMnO₃ interfaces, Y. Choi, Y. Z. Yoo, O. Chmaissem, A. Ullah, S. Kolesnik, C. W. Kimball, D. Haskel, J. S. Jiang, and S. D. Bader, J. Appl. Phys. 103, 07B517 (Feb., 2008).

Magnetically asymmetric interfaces in a (LaMnO₃)/(SrMnO₃) superlattice due to structural asymmetries, S. J. May, A. B. Shah, S. G. E. te Velthuis, M. R. Fitzsimmons, J. M. Zuo, X. Zhai, J. N. Eckstein, S. D. Bader, and A. Bhattacharya, Phys. Rev. B 77, 174409 (May, 2008); Virtual Journal of Nanoscale Science & Technology, May 19, 2008

Translational-mode dynamics of exchange-biased vortices, K. S. Buchanan, S.-H. Chung, A. Hoffmann, F. Fradin, S. D. Bader, J. Nogues, J. Sort, and V. Novosad, J. Appl. Phys. 103, 07B102 (Jan., 2008).

Preface, H. Zabel and S. D. Bader, In *Magnetic Heterostructures, Springer Tracts in Modern Physics 227*, Edited by H. Zabel and S. D. Bader (Springer, Berlin Heidelberg, 2008) pp. III-X.

Element-specific recoil loops in Sm – Co / Fe exchange-spring magnets, Y. Choi, J. S. Jiang, J. E. Pearson, S. D. Bader, and J. P. Liu, J. Appl. Phys. 103, 07E132 (Feb., 2008).