

CURRICULUM VITAE OF DIPANJAN MAZUMDAR

I. PROFESSIONAL AFFILIATION AND CONTACT INFORMATION

A. Present University Department or Unit:

Department of Physics
Southern Illinois University

B. Office Address:

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Carbondale, IL 62901 USA
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II. EDUCATION

Brown University, Providence, RI

Ph.D., Physics, Oct 2007

- Thesis Title: *Coherent Magnetotunneling based on (001) Magnesium oxide barrier.*
- Advisor: Professor Gang Xiao

M.S., Physics, May 2004

Indian Institute of Technology, Kanpur, India

M.Sc., Physics, May 2001

Presidency University, Kolkata, India

B.Sc. (Hons.), Physics, May 1999

– Minor in Chemistry and Mathematics

III. PROFESSIONAL EXPERIENCE

Assistant Professor

August 2014 to present

Department of Physics, Southern Illinois University, Carbondale

Postdoctoral Researcher

August 2012 to July 2014

Department of Chemistry, University of Tennessee, Knoxville

- Supervisor: Professor Janice Musfeldt

Assistant Research Scientist

September 2010 to July 2012

MINT Center, University of Alabama

Post Doctoral Researcher

October 2007 to July 2010

Center for Materials for Information Technology (MINT), University of Alabama

- Supervisor: Professor Arunava Gupta

IV. RESEARCH AND CREATIVE ACTIVITY

A. Interests and Specialties

Experimental condensed matter and materials physics. Design, growth and physical properties of electronic and magnetic materials and their heterostructures

- Growth and properties of thin film heterostructures using physical vapor deposition (Magnetron sputtering, Pulsed Laser Deposition).
- Spintronic device characterization, tunnel magnetoresistance and spin-transfer torque devices.
- Application of materials in spintronics, optoelectronics, photovoltaics, thermoelectrics.
- Materials interests include Topological and Quantum materials, 2D Materials, Magnetic alloys, Complex oxides.
- Structural and physical property investigations using X-ray diffraction and scattering, transport and magneto-transport, Scanning Probe Microscopy.
- Optical Spectroscopy using Reflectance/Transmittance spectroscopy and spectroscopic ellipsometry.
- First-principles electronic structure.

B. Current Projects

- Design and fabrication of new high spin-polarization inverse-Heusler materials.
- Design, characterization and magneto-transport properties of magnetoresistance devices (AMR, GMR, TMR).
- Electronic properties of electronic and magnonic topological insulators.
- Magneto-transport properties of TI-based heterostructures.
- Finite-size and proximity effects in thin-film topological insulators.

C. Grants Received

External

- [1] PI, "CAREER: Thermal stability and scaling of nanoscale spin-electronic devices based on novel inverse-Heusler alloys", NSF-ECCS. Amount: US \$500,000. Period: 7/19-6/24. **Status: Current**
- [2] Senior Personnel, "MRI: Acquisition of Multi-Mode Atomic Force Microscopy System for Research, Education and Outreach", NSF-CHE. Amount: US \$128,268.00 Period: 7/1/19-6/30/22. **Status: Current**
- [3] Senior Personnel, "REU Site for Interdisciplinary Materials Research", NSF-DMR. Amount: US \$384,244. Period: 4/1/18-3/31/21. **Status: Current**
- [4] Co-PI, "DMREF-Collaborative Research: First-Principles Based Design of Spintronic Materials and Devices", NSF-DMR. Amount: US \$1,135,495; Period: 9/12-8/16. SIU sub-contract : \$46,598 (9/1/15-8/30/16). **Status: Expired**

Internal

- [5] PI, "Investigations of atomic layers of MoS₂ and Doped MoS₂ for Electrochemical Reduction of Carbon dioxide", Advanced Coal and Energy Research Center. Amount: US \$50,000. Period: 01/7/17-06/30/18. **Status: Expired**
- [6] PI, "Investigation of porous materials and rocks for Oil and Gas Applications: Combined Experimental and Modeling Approach,"SIU Elevating Research Grant. Period: 5/15-4/16. Amount: US \$4,500. **Status: Expired**

D. Honors and Awards

- NSF CAREER Award (2019)
- Forrest Award for excellence in experimental work: Department of Physics, Brown University, (2007).
- Best Teaching Assistant Award: Physics Department, Brown University, (2002).

E. Papers and Presentations at Professional Meetings

55. Sudip Pandey, Alpha N'Diaye, Igor Dubenko, Anil Aryal, Dipanjan Mazumdar, Sujoy Roy, Shane Stadler, Naushad Ali, *Evidence of Martensitic Phase Transitions in Boron Substituted Ni-Mn-In Thin Films*, APS March Meeting, March 48, 2019; Boston, Massachusetts
54. S. Pandey, A.T. NDiaye, A. Aryal, I. Dubenko, D. Mazumdar, S. Roy, S. Stadler and N. Ali *X-ray Magnetic Circular Dichroism Study of Ni-Cu Thermoseeds for Self-Controlled Magnetic Hyperthermia*, International conference on Magnetism (ICM), San Francisco, July 15-20, 2018.
53. S. Pandey, A.T. NDiaye, I. Dubenko, A. Aryal, D. Mazumdar, S. Roy, S. Stadler and N. Ali, *X-Ray Magnetic Circular Dichroism of Boron Substituted Ni-Mn-In Thin Films*, , International conference on Magnetism (ICM), San Francisco, July 15-20, 2018.
52. H. Samassekou, A. Aryal, S. Pandey, I. Dubenko, A. Granovsky, E. Lähderanta, E. Soboleva, S. Stadler, D. Mazumdar, and N. Ali, *Evidence of Martensitic Phase Transitions in Magnetic Thin Films Based on the Mn₂FeSi Inverse Heusler Alloy*, International conference on Magnetism (ICM), San Francisco, July 15-20, 2018.
51. S. Pandey, T.N. Lamichhane, A. Al-Wahish, A.T. NDiaye, P. Das, A. Aryal, I. Dubenko, S. Roy, D. Mazumdar, H. Kaiser, S. Stadler and N. Ali, *X-ray Absorption and Neutron Diffraction study on Boron Substituted Heusler alloy Ni₅₀Mn₃₅In_{14.25}B_{0.75}*, International conference on Magnetism (ICM), San Francisco, July 15-20, 2018.
50. J. Ma, J. He, D. Mazumdar, C. Wolverton, A. Ghosh and W.H. Butler, *Computational and Experimental Investigation of Inverse Heusler Compounds for Spintronic Applications*, Magnetism and Magnetic Materials Conference, Pittsburgh, PA, Nov 6-11 2017
49. S. Pandey, A. Al-Wahish, J. Chen, A. Quetz, A. Aryal, I. Dubenko, D. Mazumdar, H. Kaiser, S. Stadler and N. Ali, *Neutron Diffraction Studies of the Boron Substituted Heusler Alloy Ni₅₀Mn₃₅In_{14.25}B_{0.75}*, Magnetism and Magnetic Materials Conference, Pittsburgh, PA, Nov 6-11 2017

48. B. Holinsworth, H. Sims, J. Cherian, D. Mazumdar, N. Harms, B.Chapman, A. Gupta, S.McGill, J. Musfeldt, *Magnetic field tunability of spin polarized excitations in a high temperature magnet*, APS March Meeting, New Orleans, LA Mar 13-17, 2017
47. A.Alkabsh, H. Samassekou, D. Mazumdar, *Optical properties of large-area MoS₂ thin films grown via magnetron sputtering: Thickness and substrate dependence*, APS March Meeting, New Orleans, LA Mar 13-17, 2017
46. Y. Sapkota, A.Alkabsh, A. Walber, S.Kovac, H. Samassekou, D.Mazumdar,*Structural and optical properties of Bismuth Selenide Bi₂Se₃ thin films: Thickness and substrate dependence*, APS March Meeting, New Orleans, LA Mar 13-17, 2017
45. M. O. Yokosuk, A. al-Wahish, S. Artyukhin, K. R. O'Neal, D. Mazumdar, P. Chen, J. Yang, Y. S. Oh, S. A. McGill, K. Haule, Sang-Wook Cheong, D.Vanderbilt, and J. L. Musfeldt, *Magnetoelectric Coupling through the Spin Flop Transition in Ni₃TeO₆*, APS March Meeting, New Orleans, LA Mar 13-17, 2017
44. S.Bakkar, A.Aryal, S.Hofer, D.Mazumdar, *Structural and magnetic properties of inverse Heusler alloys Mn₂CoZ (Z= Ga,Ge,Sb)*, APS March Meeting, New Orleans, LA Mar 13-17, 2017
43. D. Mazumdar, H.Samassekou, A.Alkbsh, M. Eaton, M. Wassala, A.Walker, T. Jayasekara, S.Talapatra, *Physical properties of large-area, few-layer MoS₂ grown using magnetron sputtering*, Gordon Research conference, Two Dimensional Electronics Beyond Graphene, Mount Holyoke College, Mount Holyoke, MA, June 5-10, 2016.
42. A.Alkbsh, H.Samassekou, A.Walker, S.Talapatra, D. Mazumdar, *Optical properties of few-layer MoS₂-based heterostructures*, American Physical Society Meeting, Baltimore, MD, March 14-18, 2016.
41. M. Eaton, H.Sirikumara, H.Samassekou, D. Mazumdar T. Jayasekara, L.Liyanage, M. B. Nardelli, *Optical and Electronic Properties of doped-MoS₂: Joint Theoretical/Experimental Study*, American Physical Society Meeting, Baltimore, MD, March 14-18, 2016.
40. H.Samassekou, R. Peterson, S. Talapatra, D. Mazumdar, *High Resolution X-ray investigation of few-layer Molybdenum Disulfide (MoS₂) Based Heterostructures*, American Physical Society Meeting, Baltimore, MD, March 14-18, 2016.
39. N. Naghibolashrafi, S. Keshavarz, J.C. Romero, K. Munira, D. Mazumdar, V.I. Hegde, J. Ma, A. Gupta, P. LeClair, W.H. Butler, A. Ghosh and C. Wolverton, *Synthesis and characterization of Fe-Ti-Sb intermetallic compounds: discovery of a new Slater-Pauling Phase*, Joint MMM/IEEE conference , San Diego, CA, Jan 11-15, 2016.
38. S. Keshavarz, N. Naghibolashrafi, K. Munira, D. Mazumdar, A. Gupta, P.R. LeClair and W.H. Butler, *A Hexagonal Half-metallic Heusler: Novel Candidate for Perpendicular Magnetic Media*, Joint MMM/IEEE conference , San Diego, CA, Jan 11-15, 2016.

37. D. Mazumdar, K. Haule, J. J. Yang, G. L. Pascut, B. S. Holinsworth, K. R. O'Neal, V. Kiryukhin, S.W. Cheong, and J. L. Musfeldt, *Optical evidence for bonding-antibonding splitting in IrTe₂*, American Physical Society Meeting, San Antonio, TX, March 2-6, 2015.
36. M. Wasala, S. Ghosh, J. Zhang, J. Richie, D. Mazumdar, Swastik Kar, Saikat Talapatra, *Electronic and photo-electronic transport in sputter deposited MoS₂ film*, American Physical Society Meeting, San Antonio, TX, March 2-6, 2015.
35. S. Pandey, A. Quetz, A. Aryal, M. Fralade, T. Samanta, K. Munira, W. Butler, I. Dubenko, D. Mazumdar, S. Stadler, N. Ali, *Fermi level tuning of highly spin-polarized complex Heusler alloys via materials genome*, American Physical Society Meeting, San Antonio, TX, March 2-6, 2015.
34. M. Yokosuk, D. Mazumdar, P. Chen, K. R. O'Neal, S. Artyukhin, S. McGill, S. -W. Cheong, K. Haule, D. Vanderbilt, and J. L. Musfeldt, *Magnetoelectric effects in Ni₃TeO₆*, 2015 Fundamental Physics of Ferroelectrics and Related Materials, Knoxville, TN January 25, 2015.
33. B. S. Holinsworth, D. Mazumdar, C. M. Brooks, J. A. Mundy, H. Das, J. G. Cherian, S. A. McGill, C. J. Fennie, D. G. Schlom, and J. L. Musfeldt, *Direct band gaps in multiferroic LuFeO₃*, 2015 Fundamental Physics of Ferroelectrics and Related Materials, Knoxville, TN January 25, 2015.
32. M. Yokosuk, D. Mazumdar, P. Chen, K. R. O'Neal, S. Artyukhin, S. McGill, S. -W. Cheong, K. Haule, D. Vanderbilt, and J. L. Musfeldt, *Magnetoelectric effects in Ni₃TeO₆*, 2014 Multiferroics and magnetoelectrics Gordon Research Conference, Biddeford, Maine, August, 2014.
31. S. Keshavarz, N. Naghibolashrafi, J.C. Romero, K. Munira, D. Mazumdar, W. Butler, P. Leclair and A. Gupta *Systematic Experimental and Theoretical Search for New Half-Metallic Heusler Alloys*, 59th Annual Conference on Magnetism and Magnetic Materials, Honolulu, Hawaii, Nov. 3-7 2014.
30. B. S. Holinsworth, H. Sims, D. Mazumdar, Q. Sun, M. K. Yurtisigi, S. Sarker, A. Gupta, W. Butler, and J. L. Musfeldt, *Band gap hierarchy of single crystal CoFe₂O₄ thin films from optical absorption spectroscopy*, American Physical Society Meeting, Baltimore, MD, March 18-22, 2013
29. D. Mazumdar, Q. -C. Sun, H. Sims, J. Ma, K. O'Neal, B. Hollinsworth, J. L. Musfeldt, and A. Gupta, *Optical properties of ferrimagnetic NiFe₂O₄ thin films*, American Physical Society March Meeting, Boston, MA, Feb. 27 - Mar.2, 2012.
28. D. Mazumdar, C. S. Hanke, A. Gupta, S. Roy *Interface magnetism in LSMO-BiFeO₃ heterostructures*, American Physical Society March Meeting, Boston, MA, Feb. 27 - Mar.2, 2012.
27. R. Klie, T. Paulauskas, Q. Qiao, A. Rebola, S. Ogut, D. Mazumdar, A. Gupta, S. Kolesnik, J.-C. Idrobo *The effects of increased Co-ion spin states on the Seebeck coefficient in thermoelectric Ca₃Co₄O₉*, American Physical Society March Meeting, Boston, MA, Feb. 27-Mar. 2, 2012.

26. R.Knut, S. Faleev, D.Mazumdar, O.Myrasov, A. Gupta, O. Karis *The valence electronic structure of multiferroic BiFeO₃ from high energy X-ray photo-electron spectroscopy and first principles theory* American Physical Society March Meeting, Boston, MA, Feb. 27-Mar. 2, 2012.
25. H. Sims, D. Mazumdar, Q. -C. Sun, J. Ma, J. L. Musfeldt, and A. Gupta, *Electronic structure of NiFe₂O₄ using screened hybrid functionals*, American Physical Society March Meeting, Boston, MA, Feb. 27 - Mar. 2, 2012.
24. R. Klie, Q. Qiao, A. Gulec, T. Paulauskas, S. Kolesnik, B. Dabrowski, C. Boyraz, M. Ozdemir, D. Mazumdar, A.Gupta *Thermoelectric properties of Ca₃Co₄O₉ thin film*, American Physical Society March Meeting, Dallas, TX, March 21-25, 2011.
23. R. Klie, Q. Qiao, A. Gulec, T. Paulauskas, S. Kolesnik, B. Dabrowski, C. Boyraz, M. Ozdemir, D. Mazumdar, A.Gupta *Strain Effects in Thermoelectric Ca₃Co₄O₉ Thin Films*, American Physical Society March Meeting, Dallas, TX, March 21-25, 2011.
22. D. Mazumdar, O. Mryasov, V. Shelke, S. Jesse, A. Baddorf, S. Kalinin, A. Gupta *Electronic Transport properties of ultra-thin BiFeO₃*, American Physical Society March Meeting, Dallas, TX, March 21-25, 2011.
21. D. Mazumdar, M. Pathak, X. Zhong, V. Kartik, A. Gupta, P. LeClair, *Nb doped TiN as a superconducting electrode for spin polarization measurements of oxides*, American Physical Society March Meeting, Dallas, TX, March 21-25, 2011.
20. T. Paulauskas, Q. Qiao, A. Gulec, R.F. Klie, C. Boyraz, M. Ozdemir, D. Mazumdar, A.Gupta, *Thermoelectric Properties and Microstructure of Ca₃Co₄O₉ thin films on SrTiO₃ and Al₂O₃ Substrates*, American Physical Society March Meeting, Dallas, TX, March 21-25, 2011.
19. D. Mazumdar, C. Boyraz, H. Dunya, M. Ozdemir, A. Gupta, Q. Qiao, A. Gulec, T. Paulauskas, R.F. Klie, S. Kolesnik and D. Dabrowski, *Effect of substrate and chemical doping on the atomic structure and physical properties of thermoelectric Ca₃Co₄O₉ thin films* 56th Annual Conference on Magnetism and Magnetic Materials, Scottsdale, AZ, Oct. 30 - Nov. 3, 2011.
18. R. Knut, S. Faleev, D. Mazumdar, O.N. Mryasov, A. Gupta and O. Karis, *The valence electronic structure of multiferroic BiFeO₃ from high energy X-ray photo-electron spectroscopy and first principles theory*, 56th Annual Conference on Magnetism and Magnetic Materials, Scottsdale, AZ, Oct. 30 - Nov. 3, 2011.
17. H. Sims, D. Mazumdar, W.H. Butler and A. Gupta *Electronic Structure of ferrimagnetic NiFe₂O₄ using the screened Hybrid Functional Method*, 56th Annual Conference on Magnetism and Magnetic Materials, Scottsdale, AZ, Oct. 30 - Nov. 3, 2011.
16. Q.-C. Sun, D. Mazumdar, J. Ma, A. Gupta, and J. L. Musfeldt, *Optical properties of ferrimagnetic NiFe₂O₄ thin films*, 56th Annual Conference on Magnetism and Magnetic Materials, Scottsdale, AZ, Oct. 30 - Nov. 3, 2011.

15. D. Mazumdar, V. Shelke, M. Iliev, S. Jesse, A. Kumar, S.V. Kalinin, A.P. Baddorf and A. Gupta, *Nanoscale switching characteristics of nearly tetragonal BiFeO₃ thin films* 55th Annual Conference on Magnetism and Magnetic Materials, Atlanta, Ga, Nov. 14-18, 2010.
14. V. Shelke, D. Mazumdar, G. Srinivasan and A. Gupta, *The Role of SrRuO₃ Bottom Layer in Strain Relaxation of BiFeO₃ Thin Films Deposited on Lattice Mismatched Substrates*, 55th Annual Conference on Magnetism and Magnetic Materials, Atlanta, Ga, Nov. 14-18, 2010.
13. V. Sankar, D. Mazumdar, J. Ma, X. Zhong and A. Gupta, *Structural and Magneto-Transport Properties of Thin Films and Spin-Filter Devices Based on Spinel Ferrites*, 55th Annual Conference on Magnetism and Magnetic Materials, Atlanta, Ga, Nov. 14-18, 2010.
12. C. Boyraz, D. Mazumdar, M. Iliev, J. Ma, G. Srinivasan and A. Gupta *Structural properties of Lithium Ferrite thin films: Low temperature growth and effect of lattice mismatch*, 55th Annual Conference on Magnetism and Magnetic Materials, Atlanta, Ga, Nov. 14-18, 2010.
11. D. Mazumdar, V. Shelke, A. Gupta, S. Jesse, S.V. Kalinin, A. Baddorf, *Ferroelectric behavior of ultra-thin BiFeO₃ films*, American Physical Society March Meeting, Portland, OR, Mar 15-19, 2010.
10. M. Pathak, H. Sims, K. Chetry, D. Mazumdar, P. LeClair, G. Mankey, W. Butler and A. Gupta, *Robust magnetism on (110) CrO₂ thin films due to increased co-linearity of Cr spins*, 11th Joint MMMIntermag Conference, Washington DC, 18-22 Jan, 2010.
9. H. Sims, D. Mazumdar and W.H. Butler, *The effect of substrate-induced strain on the magnetic structure of CrO₂*, 11th Joint MMMIntermag Conference, Washington DC, 18-22 Jan, 2010.
8. M. Williams, H. Sims, D. Mazumdar and W.H. Butler, *Effect of 3d-transition metal substitution on the electronic properties of CrO₂*, 11th Joint MMMIntermag Conference, Washington DC, 18-22 Jan, 2010.
7. N. Bao, L. Shen, Y.A. Wang, J. Ma, D. Mazumdar and A. Gupta *Self-Assembly of Superparamagnetic Cobalt Ferrite Nanocrystal Clusters*, 11th Joint MMMIntermag Conference, Washington DC, 18-22 Jan, 2010.
6. D. Mazumdar and A. Gupta, *XMCD analysis of LSMO/XTO interfaces (X-Sr, Ba)*, 53rd Annual Conference on Magnetism and Magnetic Materials, Austin, TX, Nov. 10-14, 2008.
5. D. Mazumdar, W. Shen, X.Y. Liu, B.D. Schrag, M. Carter, G. Xiao, *Low frequency noise in highly sensitive magnetic tunnel junctions with (001) MgO tunnel barrier*, 52nd Annual Conference on Magnetism and Magnetic Materials, Tampa, FL, Nov. 5-9, 2008.
4. X. Liu, B.D. Schrag, D. Mazumdar, W. Shen and G. Xiao *Effects of exchange coupling on the low frequency noise of MgO-based magnetic tunnel junction sensors*, 10th Joint MMMIntermag Conference, Baltimore, MD, Jan. 711, 2007.

3. W. Shen, D. Mazumdar, X. Liu, B.D. Schrag and G. Xiao, *MgO-based magnetic tunnel junction (MTJ) sensors with synthetic antiferromagnetic (SAF) free layer*, 10th Joint MM- MIntermag Conference, Baltimore, MD, Jan. 711, 2007.
2. B.D. Schrag, X. Liu, D. Mazumdar, W. Shen and G. Xiao *Low-field magnetic tunnel junction sensor characterization via sensitivity asteroid curves*, 10th Joint MMMIntermag Conference, Baltimore, MD, Jan. 711, 2007.
1. D. Mazumdar, and G. Xiao, *Scanning magnetoresistance microscopy study of quasi-static magnetic switching in mesoscopic square dots*, 49th Annual Conference on Magnetism and Magnetic Materials, Jacksonville, FL, Nov. 1419, 2004.

F. Invited talks and Presentations

15. University of Missouri, Department of Physics, Columbia, MO: *Growth and physical properties of novel electronic and spintronic materials* : Mar 20, 2018.
14. West Virginia University, Department of Physics, Morgantown, WV: *Growth and physical properties of electronic and spintronic materials* : Feb 22, 2018.
13. Missouri University Research Reactor, University of Missouri, Columbia, MO: *Physical properties of electronic, optoelectronic, and magnetic materials* : April 20, 2017.
12. Material Science Seminar Series, Augusta University, Augusta, GA: *Optical spectroscopy of functional materials*: Sept 23, 2016.
11. Telluride Science Conference, Telluride, CO: *Optical properties of IrTe₂* : June 13 - 18, 2015.
10. University of Alabama, Bernard Ames Metallurgical and Materials Engg Seminar, Tuscaloosa, AL: *Optical properties of complex materials* : March 13, 2015.
9. Southern Illinois University, Dept. of Physics, Carbondale, IL: *Optical spectroscopy of novel materials*: March 28, 2014.
8. University of Alabama, Dept. of Physics, Tuscaloosa, AL: *From new materials to devices for the future: the interface matters*: May 25, 2013.
7. University of Arizona, Dept. of Physics, Tuscan, AZ: *Nanoscale tunnel barriers for spintronic devices*: Feb 1 2012.
6. University of Pittsburgh, Dept. of Material Science, Pittsburgh, PA: *Tailoring properties of thin films and heterostructures for spin-based applications* : Jan 11 2012.
5. West Virginia University, Dept. of Physics, Morgantown, WV: *Insulating materials for spin-based applications*: Jan 9 2012.
4. Nanoelectronics Research Initiative (NRI) Annual Review, Washington DC: *Magnetic Insulators for spin-based applications*: October 25 2011.

3. University of Tennessee, Dept. of Chemistry Knoxville, TN: *Complex-oxide materials for future spin-based applications* : June 23 2011
2. Harvard University, Dept. of Applied Physics, Boston, MA, *Spin coherent tunneling and magnetic tunnel junctions*: June 1 2007.
1. National Institute of Standards and Technology, Gaithersburg, MD, *Thermal stability, sensitivity and noise characteristics of MgO-based Magnetic Tunnel Junctions*: May 25 2007.

V. PUBLICATIONS AND CREATIVE WORKS

A. Books: None

B. Articles in Professional Journals:

Total ISI citations = 1075; h-index = 19

* denotes corresponding author with SIU affiliation.

56. *A simple approach to analyze layer-dependent optical properties of few-layer transition metal dichalcogenide thin films*, Asma Alkabsh, Hassana Samassekou, Dipanjan Mazumdar*; *Nanotechnology* **30** (3) 03LT02 (2019).
55. *Fe₂MnGe: A hexagonal Heusler analogue*, S Keshavarz, N Naghibolashrafi, Michelle Elizabeth Jamer, K Vinson, Dipanjan Mazumdar, Cindi L Dennis, W Ratcliff II, Julie A Borchers, A Gupta, P LeClair; *Journal of Alloys and Compounds* **771** 793 (2019).
54. *Giant resistive switching in mixed phase BiFeO₃ via phase population control*, David Edwards, Niall Browne, Kristina M Holsgrove, Aaron B Naden, Sayed O Sayedghaee, Bin Xu, Sergey Prosandeev, Dawei Wang, Dipanjan Mazumdar, Martial Duchamp, Arunava Gupta, Sergei V Kalinin, Miryam Arredondo, Raymond GP McQuaid, Laurent Bellaiche, J Marty Gregg, Amit Kumar; *Nanoscale* **10** 17629-17637 (2018).
53. *Bulk transport properties of bismuth selenide thin films grown by magnetron sputtering approaching the two-dimensional limit*, Yub Raj Sapkota, Dipanjan Mazumdar*; *Journal of Applied Physics* **124** 105306 (2018).
52. *Computational investigation of inverse Heusler compounds for spintronics applications*, Jianhua Ma, Jiangang He, Dipanjan Mazumdar, Kamaram Munira, Sahar Keshavarz, Tim Lovorn, C Wolverton, Avik W Ghosh, William H Butler; *Phys Rev B*. **98** 094410 (2018).
51. *Atomic-level insights through spectroscopic and transport measurements into the large-area synthesis of MoS₂ thin films*, Hassana Samassekou, Asma Alkabsh, Kenneth Stiwinter, Avinash Khatri, Dipanjan Mazumdar*; *MRS Communications* **8** 1328-1334 (2018).
50. *Electromechanical-mnemonic effects in BiFeO₃ for electric field history-dependent crystallographic phase patterning*, SM Neumayer, N Browne, AB Naden, D Edwards, Dipanjan Mazumdar, N Bassiri-Gharb, A Kumar, BJ Rodriguez; *Journal of Materials Science* **53** 10231 (2018).

49. *Magnetic field control of charge excitations in CoFe_2O_4* , Brian S Holinsworth, Nathan C Harms, Shiyu Fan, Dipanjan Mazumdar, Arun Gupta, Stephen A McGill, Janice L Musfeldt; *APL Materials* **6** 066110 (2018).
48. *Recent advances in investigations of the electronic and optoelectronic properties of group III, IV, and V selenide based binary layered compounds*, Milinda Wasala, Hansika I Sirikumara, Yub Raj Sapkota, Stephen Hofer, Dipanjan Mazumdar, Thushari Jayasekera, Saikat Talapatra; *Journal of Materials Chemistry C* **5** (43), 11214-11225 (2017).
47. *Magnetic field tunability of spin-polarized excitations in a high-temperature magnet*, BS Holinsworth, Hunter Sims, JG Cherian, Dipanjan Mazumdar, NC Harms, BCL Chapman, Arun Gupta, SA McGill, JL Musfeldt; *Phys. Rev B* **96** 094427 (2017).
46. *Viable route towards large-area two dimensional MoS_2 using magnetron sputtering*, H. Samassekou, A. Alkabsh, M. Wasala, M. Eaton, A. Walber, A. Walker, O. Pitkänen, K. Kordas, S. Talapatra, T. Jayasekera, Dipanjan Mazumdar*; *2D Materials* **4** 021002 (2017).
45. *Optical evidence for blue shift in Topological insulator Bismuth selenide in the few-layer limit*, Yub Raj Sapkota, Asma Alkabsh, Aaron Walber, Hassana Samassekou, Dipanjan Mazumdar*; *Applied Physics Letters* **110** 181901 (2017).
44. *Atomic and Electronic Structure of Ti substitution in $\text{Ca}_3\text{Co}_4\text{O}_9$* , X.Hu, P.J Phillips, Dipanjan Mazumdar, J.C. Idrobo, S. Kolesnik, A.Gupta, S.Ogut, R. F. Klie; *Journal of Applied Physics* **120** 205105 (2016).
43. *Magnetoelectric Coupling through the Spin Flop Transition in Ni_3TeO_6* , M. O. Yokosuk, A. al-Wahish, S. Artyukhin, K. R. O'Neal, Dipanjan Mazumdar, P. Chen, J. Yang, Y. S. Oh, S. A. McGill, K. Haule, Sang-Wook Cheong, D.Vanderbilt, and J. L. Musfeldt; *Physical Review Letters* **117** 147402 (2016).
42. *The valence band electronic structure of rhombohedral-like and tetragonal-like BiFeO_3 thin films from hard X-ray photoelectron spectroscopy and first-principles theory*, Dipanjan Mazumdar, R Knut, F Thöle, M Gorgoi, S. Faleev, O.N Mryasov, V. Shelke, C Ederer, N.A Spaldin, A Gupta, O Karis; *Journal of Electron Spectroscopy and Related Phenomena* **208** 63 (2016).
41. *Effect of underlying boron nitride thickness on photocurrent response in molybdenum disulfide-boron nitride heterostructures*, M. Wasala, J. Zhang, S. Ghosh, B. Muchharla, R. Malecek, Dipanjan Mazumdar, H. Samassekou, M. Gaither-Ganim, A. Morrison, N.-P. Lopez, V. Carozo, Z. Lin, M. Terrones, S. Talapatra; *Journal of Materials Research* **31** 893 (2016).
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35. *Magnetic-field-induced shift of the optical band gap in Ni₃V₂O₈*, P Chen, B.S Holinsworth, K.R.O'Neal, T.V Brinzari, Dipanjan Mazumdar, Y.Q Wang, S McGill, R.J. Cava, B Lorenz, J.L. Musfeldt; *Phys. Rev. B* **89** 165120 (2014).
34. *Altered magnetism and new electronic length scales in magnetoelectric La_{2/3}Sr_{1/3}MnO₃-BiFeO₃ heterointerface*, S. K. Mishra, Dipanjan Mazumdar, K. Tarafdar, Lin-Wang Wang, S. D. Kevan, C. Sanchez-Hanke, A. Gupta, S. Roy; *New. J. Phys.* **15** 113042 (2013).
33. *Chemical tuning of the optical band gap in spinel ferrites: CoFe₂O₄ vs NiFe₂O₄*, B.S. Holinsworth, Dipanjan Mazumdar, H. Sims, Q.-C. Sun, M.K. Yurtisigi, S.K. Sarker, A. Gupta, W.H. Butler, J.L. Musfeldt; *Appl. Phys. Lett.* **103** 82406 (2013).
32. *Spectroscopic Determination of Phonon Lifetimes in Rhenium-Doped MoS₂ Nanoparticles*, Qi-C Sun, Dipanjan Mazumdar, Lena Yadgarov, Rita Rosentsveig, Reshef Tenne, J. L. Musfeldt; *Nano Letters* **13** 2803 (2013).
31. *Nanoscale electroresistance properties of all-oxide magneto-electric tunnel junction with ultra-thin barium titanate barrier*, G. Kim, Dipanjan Mazumdar, A. Gupta; *Appl. Phys. Lett.* **102**, 052908 (2013).
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29. *Optical band gap hierarchy in a magnetic oxide: Electronic structure of NiFe₂O₄*, Q.C. Sun, H.Sims, Dipanjan Mazumdar, J.X.Ma, B.S. Holinswoth, K.O'Neal, W.H.Butler, A.Gupta, and J.L.Musfeldt; *Phys. Rev. B* **86** 205106 (2012).
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26. *Ab-initio adsorption study of chitosan on functionalized graphene: Critical role of van der waals interactions*, Rezwanur Rahman and Dipanjana Mazumdar; *J. Nanosci. Nanotech.* **12** 2360 (2012).
25. *Synthesis and Magnetic Properties of Cr_2Te_3 and CuCr_2Te_4 Nanocrystals*, Karthik Ramasamy, Dipanjana Mazumdar, Robert Bennett and Arunava Gupta; *Chemical Comm.* **48** 5656 (2012).
24. *Colloidal Synthesis of Magnetic CuCr_2S_4 Nanocrystals and Nanoclusters*, Karthik Ramasamy, Dipanjana Mazumdar, Ziyou Zhou, Yu-Hsiang A. Wang, and Arunava Gupta; *J. Am. Chem. Soc.* **133** 20716 (2011).
23. *Barrier height and tunneling aspects in (110) CrO_2 with its natural barrier*, Manjit Pathak, Dipanjana Mazumdar, Xueyu Zhang, Krishna Chetry, Sahar Keshavarz, Sankar Vijay Karthik, Patric LeClair, and Arunava Gupta; *J. Appl. Phys.* **110** 053708 (2011).
22. *Effect of substrate on the atomic structure and physical properties of thermoelectric $\text{Ca}_3\text{Co}_4\text{O}_9$ thin films*, Q. Qiao, A. Gulec, T. Paulauskas, Robert F. Klie, S. Kolesnik, B. Dabrowski, M. Ozdemir, C. Boyraz, Dipanjana Mazumdar, and A. Gupta; *J. Phys: Cond Mat* **23** 305005 (2011).
21. *Anomalous Hall behavior in (100) and (110) CrO_2 thin films*, H.Sato, M. Pathak, Dipanjana Mazumdar, X. Zhang, G.J. Mankey, P. Leclair, A. Gupta; *J. Appl. Phys.* **109** 103907 (2011).
20. *The Role of SrRuO_3 Bottom Layer in Strain Relaxation of BiFeO_3 Thin Films Deposited on Lattice Mismatched Substrates*, Vilas Shelke, Dipanjana Mazumdar, Srinivasan Gopalan, and Arunava Gupta; *J. Appl Phys.* **109** 07D914 (2011).
19. *Reduced Coercive Field in BiFeO_3 Thin Films through Domain Engineering*, Vilas Shelke, Dipanjana Mazumdar, Gopalan Srinivasan, Amit Kumar, Stephen Jesse, Sergei Kalinin, Arthur Baddorf , and Arunava Gupta; *Advanced Materials* **23** 669 (2011).
18. *Monitoring B-site ordering and strain relaxation in NiFe_2O_4 epitaxial films by polarized Raman spectroscopy*, M.N. Iliev, Dipanjana Mazumdar, J.X. Ma, A. Gupta, F. Rigato, and J. Fontcuberta; *Phys. Rev. B* **83** 014108 (2011).
17. *Structural and Magnetic Properties of Lithium Ferrite (LiFe_5O_8) Thin Films: Influence of Substrate on the Octahedral-site Order*, Cihat Boyraz, Dipanjana Mazumdar, Milko Iliev, Vera Marinova, Jianxing Ma, G. Srinivasan, and Arunava Gupta; *Appl. Phys. Lett.* **98** 012507 (2011).
16. *A Robust Approach for the Growth of Epitaxial Spinel Ferrite Films*, J. X. Ma, Dipanjana Mazumdar, G. Kim, H. Sato, N. Z. Bao, A. Gupta; *J. Appl. Phys.* **108** 063917 (2010).

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14. *Formation of anti-phase domains in NiFe₂O₄ thin films deposited on different substrates*, R. Datta, S. Kanuri, S. V. Karthik, Dipanjan Mazumdar, J. X. Ma and A. Gupta; *Appl. Phys. Lett.* **97** 071907 (2010).
13. *Polarized Raman spectroscopy of nearly tetragonal BiFeO₃ thin films* M. N. Iliev, M. V. Abrashev, Dipanjan Mazumdar, V. Shelke, and A. Gupta; *Phys. Rev. B* **82** 014107 (2010).
12. *Nanoscale switching properties of nearly tetragonal BiFeO₃ thin films*, Dipanjan Mazumdar, Vilas Shelke, Milko Iliev, Stephen Jesse, Amit Kumar, Sergei V. Kalinin, Arthur P. Baddorf and Arunava Gupta; *Nano Letters* **10** 2555 (2010).
11. *Robust room-temperature magnetism of (110) CrO₂ thin films*, Manjit Pathak, H. Sims, K. Chetry, Dipanjan Mazumdar, Patrick Leclair, G.Mankey and A.Gupta; *Phys. Rev. B* **80** 212405 (2009).
10. *Controlled Growth of Monodisperse Self-Supported Superparamagnetic Nanostructures of Spherical and Rod-Like CoFe₂O₄ Nanocrystals*, N.Z. Bao, L. Shen, Y.H.A. Wang, J.X.Ma, Dipanjan Mazumdar, and A.Gupta; *J. Am. Chem. Soc.* **131** 1290 (2009).
9. *Field sensing characteristics of magnetic tunnel junctions with (001) MgO tunnel barrier*, Dipanjan Mazumdar, Weifeng Shen, Xiaoyong Liu, B.D. Schrag, M.J. Carter, and Gang Xiao; *J. Appl. Phys.* **91** 033507 (2008).
8. *Magnetic characterization of magnetic tunnel junction devices using circle transfer curves*, N.S. Safron , B.D Schrag, Xiaoyong Liu, W.F Shen, Dipanjan Mazumdar, MJ Carter, Gang Xiao; *J. Appl. Phys.* **103** 033507 (2008).
7. *Low frequency noise in highly sensitive magnetic tunnel junctions with (001) MgO tunnel barrier*, Dipanjan Mazumdar, Xiaoyong Liu, B.D. Schrag, W.Shen, M.J.Carter, and Gang Xiao; *Appl. Phys. Lett.* **91** 033507 (2007).
6. *Thermal stability, Sensitivity and Noise characteristics of MgO based Magnetic Tunnel Junctions*, Dipanjan Mazumdar, X.Y Liu, B.D.Schrag, W.Shen, M.J.Carter, and Gang Xiao; *J. Appl. Phys.* **101** 09B502 (2007).
5. *Thermal Stability of magnetic tunnel junctions with MgO barriers for high temperature spintronics*, Xiaoyong Liu, Dipanjan Mazumdar, Weifeng Shen, B.D.Schrag and Gang Xiao; *Appl. Phys. Lett.* **89** 023504 (2006).
4. *Effect of film roughness in MgO-based magnetic Tunnel Junctions*, Weifeng Shen, Dipanjan Mazumdar, Xiaojing Zou, Xiaoyong Liu, B.D. Schrag, and Gang Xiao; *Appl. Phys. Lett.* **88** 182508 (2006).

3. *Scanning magnetoresistance microscopy study of quasi-static magnetic switching in mesoscopic square dots: observation of field-driven transition between flux-closure states*, Dipanjana Mazumdar and Gang Xiao; *IEEE Trans. on Magnetics* **41** 2226 (2005).
2. *In-situ detection of single micron-sized magnetic beads using magnetic tunnel junction sensors*, Weifeng Shen, Xiaoyong Liu, Dipanjana Mazumdar and Gang Xiao; *Appl. Phys. Lett.* **86** 253901 (2005).
1. *Magnetization reversal of submicrometer Co rings with uniaxial anisotropy via scanning magnetoresistance microscopy*, Xiaoyong Liu, Dipanjana Mazumdar, B.D Schrag, Weifeng Shen, and Gang Xiao; *Phys. Rev B* **70** 014407 (2004).

C. Creative Contributions: None

D. Chapters in Professional Books: None

E. Popular and Creative Writing: None

F. Book Reviews: None

VI. TEACHING EXPERIENCE

A. Teaching Interests and Specialties

All areas of Physics at the undergraduate level. Solid State Physics and Experimental Physics at the graduate level.

Southern Illinois University, Carbondale, IL

PHYS 301: Theoretical methods in Physics **FA14-16,18;SP15**

- A course in mathematical methods for undergraduate physics majors covering Power series, complex algebra, vector calculus, linear algebra, ordinary differential equations, orthogonal polynomials, and Fourier series.

PHYS 203B: College Physics **FA17, SP18**

- Algebra-based course in Electricity Magnetism for science and non-science Majors.

PHYS 430: Quantum Mechanics 1 **SP18,19**

- Undergraduate quantum mechanics for Physics Majors.

PHYS 440: Quantum Mechanics II **FA19**

- Applications of quantum mechanics to include time-independent and time dependent perturbation theory, variational methods, introduction to solid-state physics and materials.

253A/253B/255A/255B/355: Lab coordinator **FA15,16,18;SP16,17**

PHYS 450: Advanced Undergraduate Lab **FA15;SP16,17,19**

PHYS 575: Special Topics in Physics **FA18,19;SP18;Sum15**

The University of Alabama, Tuscaloosa, AL

PHYS 102: General Physics (without calculus, equivalent of 203B) **Summer 2011**

- Introductory course covering electricity and magnetism, optics, relativity and modern physics

PHY 256: Introduction to Modern Physics **Fall 2011**

- Sophomore-level course covering relativity, quantum mechanics and solid state physics.

B. Teaching and Training Grants: None

C. Teaching Awards and Honors: None

D. Current Graduate Faculty Status

Regular - Eligible to teach graduate-level courses, direct master's theses, serve on master's and doctoral committees.

E. Masters and Ph.D. Committees on which you have served

Masters in Physics

Nikesh Maharjan (2015), Anil Aryal (2015), Sudip Pandey (2015), Mohammed Halool Mohammed Al-Aboodi (2015), Michael Fralaide (2015), Jacob Huffstutler (2014), John Malone (2014), Nick Dewaele (2014)

PhD

Ahmed Qamar (Chemistry, 2019), Milinda Wasala (2019), Alborz Niknam (Mech Engg, 2018), Brice Russell (Physics, 2017), Bamidele Falola (Material Science, 2017), Sujoy Ghosh (Physics, 2016), Ahmed Salah Mahdi Al-Asadi (Physics, 2016), Jie Zhang (Physics, 2015), Ain Uddin (Chemistry), Tayler Delanie Hill (Chemistry)

F. Names of Students who have completed Masters Theses and Doctoral Dissertations under your direction

- Sudip Pandey (PhD, co-advisor): "*Exploring structural, electronic, and magnetoresponse properties of novel magnetic materials in bulk, ribbons, and thin films.*" (2018)
- Asma Alkabsh (PhD): "*Electronic and energy applications of few-layer MoS₂.*" (2018)
- Hassana Samassekou (PhD): "*Novel approach leading to large-area synthesis of 2D materials and their structural, optical, and electronic transport properties.*" (2018)
- Stephen Hofer (MS): "*Time reversal symmetry breaking in 4f doped Topological insulators.*" (2018)
- Yub Raj Sapkota (MS): "*Physical properties of topological insulator bismuth selenide thin films.*" (2017).
- Said Bakkar (MS): "*New inverse-Heusler materials with potential Spintronics applications.*" (2017)

G. Student advising or mentoring

Masters: Duston Wetzel

PhD: Yub Raj Sapkota, Stephen Hofer, Anil Aryal (co-advisor)

Undergraduate (all years): Richard Peterson (2014-16), Aaron Walber (2014-17), Kyle Dawson (2014-2017), Andrew Walker (2014-16), Andrew Morrison (2015-16), Miller Eaton (2015-16), Gaither-Ganim Moses (REU, 2015), Sarah Kovac (2015-17), Bradley Krueger (REU, 2016), Madelyn Kramer (2016-17), Andrew Wichmann (2017), Kenneth Stiwinter (REU, 2017), Riley Smith (2017-18, including 2018 REU), Bohdan Paikoush (2017-), Riley Carver (2018), Avinash Khatri (2018-), Daja Dunbar (2018-), Sitney Day (2018-19), Bret Allen McCarty (2018-), Gregory Price (REU, 2019), Jake Wheeler (2019-)