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Research Interest

◇ Quantum Materials (Experiment)

◇ Magnetism (Experiment)

Education

- **Ph.D.**, Physics (Condensed Matter Expt.), The University of Texas at Austin, USA
  - Dissertation Title: `Strongly Correlated Systems: Magnetic Measurements of Magnesium Diboride and Group IV Magnetic Semiconductor Alloys`
- **M.S.**, Physics, Indian Institute of Science, Bangalore, India
- **B.Sc.**, Physics with Honors, Presidency College, University of Calcutta, India

Work Experience

- **Assistant Professor**, Howard University, Washington, DC, USA (8/2018 – present)
- **Postdoctoral Fellow**, University of Maryland, College Park, USA
  - Research Topics: Study of two-level defect states by circuit Quantum Electrodynamics
- **Research Associate**, The University of Texas at Austin, USA
  - Research Topics: Mesoscale spin glass dynamics; growth and characterizations of topological insulators (TI), & transition metal dichalcogenides (TMD); and HOPG magnetism.
- **Postdoctoral Fellow**, Microelectronics Research Center, Austin, USA
  - Research Topics: Dilute magnetic semiconductors (DMS) and magnetic nanoparticles.

Publication

- **Number of Journal Publications: 24**

◇ **Samaresh Guchhait*** and Raymond Orbach, "Magnetic Field Dependence of Spin Glass Free Energy Barriers", *Physical Review Letters* **118**, 157203 (2017).
* *Corresponding author*
[First accurate measurement of field dependence of free energy barriers in glass.]

◇ R. Salas, **S. Guchhait**, *et al.*, "Growth rate and surfactant-assisted enhancements of rare-earth arsenide InGaAs nanocomposites for terahertz generation", *APL Materials* **5**, 096106 (2017).
[*Study of combined effects of the growth rate and surfactant on the properties of III-V nanocomposites containing rare-earth-monopnictide nanoparticles.*]

◇ S. Mozaffari, **S. Guchhait** and J. T. Markert, "Spin-orbit interaction and Kondo scattering at the $PrAlO_3/SrTiO_3$ interface: Effects of oxygen content", *Journal of Physics: Condensed Matter* **29**, 395002 (2017).

[*Study of the electronic and magnetic properties of $PrAlO_3$ films grown on TiO_2 terminated $SrTiO_3$ substrates.*]

◇ T. Pramanik, A. Roy, R. Dey, A. Rai, **Samaresh Guchhait**, H. C. P. Movva, C.-C. Hsieh, S. K. Banerjee, "Angular dependence of magnetization reversal in epitaxial chromium telluride thin films with perpendicular magnetic anisotropy", *Journal of Magnetism and Magnetic Materials* **437**, 72 (2017).

[*First report of the existence of strong perpendicular magnetic anisotropy in chromium telluride thin films.*]

◇ R. Dey, A. Roy, T. Pramanik, **Samaresh Guchhait**, S. Sonde, A. Rai, L. F. Register, and S. K. Banerjee, "Localization and interaction effects of epitaxial Bi_2Se_3 bulk states in two-dimensional limit", *Journal of Applied Physics* **120,**, 164301 (2016).

[*Effects of quantum interference and electron-electron interactions in 2D transport of topological insulators.*]

◇ S. Majumder, **S. Guchhait**, R. Dey, L. F. Register, S. K. Banerjee, "Large Magnetoresistance at Room Temperature in Ferromagnet/Topological Insulator Contacts", *IEEE Transactions on Nanotechnology* **15**, 671 (2016).

[*Study of magnetoresistance associated with the relative orientation of the ferromagnet and spin-polarized electrons moving on the surface of topological insulator.*]

◇ R. Salas, **S. Guchhait**, *et al.*, "Surfactant-assisted growth and properties of rare-earth arsenide InGaAs nanocomposites for terahertz generation", *Applied Physics Letters* **108**, 182102 (2016).

[*Effects of surfactant-mediated epitaxy on the structural, electrical, and optical properties of fast metal-semiconductor superlattice photoconductors.*]

◇ A. Roy, *et al.*, "Structural and Electrical Properties of $MoTe_2$ and $MoSe_2$ Grown by Molecular Beam Epitaxy", *ACS Applied Materials & Interfaces* **8**, 7396 (2016).

[*First report of structural and electrical properties of thin films of molybdenum ditelluride and molybdenum diselenide grown on sapphire substrates by molecular beam epitaxy (MBE).*]

◇ **Samaresh Guchhait*** and Raymond Orbach, "Temperature chaos in a Ge:Mn thin-film spin glass", *Physical Review B* **92**, 214418 (2015).

* *Corresponding author*

[First experimental verification of temperature chaos in spin glass.

First accurate estimation of temperature chaos critical exponent, ζ.
Invited talk at APS March Meeting, 2016.]

◇ A. Rai, *et al.*, "Air Stable Doping and Intrinsic Mobility Enhancement in Monolayer Molybdenum Disulfide by Amorphous Titanium Suboxide Encapsulation", *Nano Letters* **15**, 4329 (2015).
[*Use of high-κ dielectric to reduce Schottky-barrier-induced contact & access resistances and enhancement of mobility of monolayer molybdenum disulfide.*]

◇ A. Roy, **S. Guchhait**, *et al.*, "Perpendicular Magnetic Anisotropy and Spin Glass-like Behavior in Molecular Beam Epitaxy Grown Chromium Telluride Thin Films", *ACS Nano* **9**, 3772 (2015).
[*First study of molecular beam epitaxy grown chromium telluride thin films.*]

◇ R. Salas, **S. Guchhait**, *et al.*, "Growth and properties of rare-earth arsenide InGaAs nanocomposites for terahertz generation", *Applied Physics Letters* **106**, 081103 (2015).
[*Studies of electrical, optical, and structural properties of fast photoconductors of $In_{0.53}Ga_{0.47}As$ containing a number of different rare-earth arsenide nanostructures to tailor its photoconductive properties.*]

◇ **S. Guchhait**,* G. G. Kenning, R. L. Orbach, G. F. Rodriguez, "Spin glass dynamics at the mesoscale", *Physical Review B* **91**, 014434 (2015).
* *Corresponding author*
[Proposes a new model of spin glass which incorporates dimensionality.
Also disproved one of the most accepted models in the field.]

◇ **Samaresh Guchhait*** and Raymond Orbach, "Direct Dynamical Evidence for the Spin Glass Lower Critical Dimension $2 < d_\ell < 3$", *Physical Review Letters* **112**, 126401 (2014).
* *Corresponding author*
[First experimental verification of spin glass lower critical dimension.
First experimental realization of 2D spin glass state.]

◇ R. Dey, T. Pramanik, A. Roy, A. Rai, **S. Guchhait**, S. Sonde, H. C. P. Movva, L. Colombo, L. F. Register, and S. K. Banerjee, "Strong spin-orbit coupling and Zeeman spin splitting in angle dependent magnetoresistance of Bi_2Te_3", *Appl. Phys. Lett.* **104**, 223111 (2014).
[*Temperature dependent magneto-transport studies of Bi_2Te_3 thin film with extensive modeling and analysis.*]

◇ **S. Guchhait**,* H. Ohldag, E. Arenholz, D. A. Ferrer, A. Mehta, and S. Banerjee, "Magnetic ordering of implanted Mn in HOPG substrates", *Physical Review B* **88**, 174425 (2013).
* *Corresponding author*

[First report of existence of inverted double hysteresis in HOPG.
First use of AFM nanocrystals to study magnetic properties of a host substrate.]

◇ **Samaresh Guchhait**, and Hendrik Ohldag, "Putting the Spin on Graphite: Observing the Spins of Impurity Atoms Align", *Stanford Synchrotron Radiation Lightsource Research Highlights*, February 28, 2014.

◇ A. Roy, **S. Guchhait**, S. Sonde, R. Dey, T. Pramanik, A. Rai, H. C. P. Movva, L. Colombo, and S. K. Banerjee, "Two-dimensional weak anti-localization in Bi_2Te_3 thin film grown on Si(111)-(7×7) surface by molecular beam epitaxy", *Appl. Phys. Lett.* **102**, 163118 (2013).
[*Low temperature magneto-transport studies of Bi_2Te_3 topological insulator thin films grown by MBE.*]

◇ J. Mantey, W. Hsu, J. James, E. U. Onyegam, **S. Guchhait** and S. K. Banerjee, "Ultra-smooth epitaxial Ge grown on Si(001) utilizing a thin C-doped Ge buffer layer", *Applied Physics Letters* **102**, 192111 (2013).
[*Studies of properties and growth of epitaxial Ge films grown on a thin buffer layer of C doped Ge on Si.*]

◇ **Samaresh Guchhait**,* M. Jamil, H. Ohldag, A. Mehta, E. Arenholz, G. Lian, A. LiFatou, D. A. Ferrer, J. T. Markert, L. Colombo and S. K. Banerjee, "Ferromagnetism in Mn-implanted epitaxially grown Ge on Si (100)", *Physical Review B* **84**, 024432 (2011).
* *Corresponding author*
[Study of group IV dilute magnetic semiconductor Ge:Mn.
First to show that amorphous phase of Ge:Mn is ferromagnetic, while crystalline phase is not ferromagnetic.]

◇ D. A. Ferrer, **S. Guchhait**, H. Liu, F. Ferdousi, C. Corbet, H. Xu, M. Doczy, G. Bourianoff, L. Mathew, R. Rao, S. Saha, M. Ramon, S. Ganguly, J. T. Markert, and S. K. Banerjee, "Origin of shape anisotropy effects in solution-phase synthesized FePt nanomagnets", *Journal of Applied Physics* **110**, 014316 (2011) and *Virtual Journal of Nanoscale Science & Technology* **24**, July 25, 2011.
[*Study on the effects of shape and magneto-crystalline anisotropy on magnetic and electronic properties of magnetic nanocrystals.*]

◇ G. Liang, H. Fang, **S. Guchhait**, C. Hoyt, and J.T. Markert, "Effects of sintering temperature on the superconductivity in Ti-sheathed MgB_2 wires", *Advances in Cryogenic Engineering* **56**, 281 (2010).
[*Study on the effects of sintering temperature on the superconducting properties of Ti-sheathed MgB_2 wires .*]

◇ C. Sun, H. C. Floresca, J. G. Wang, J. Mustafa, **S. Guchhait**, D. Ferrer, S. K. Banerjee, G. Lian, L. Colombo and M. J. Kim, "Amorphous Structure and Stability of Mn Implanted GeC Ferromagnetic Semiconductor", *Microscopy and Microanalysis* **15**(S2), 1216 (2009). [*Structural studies on Mn-doped GeC dilute magnetic semiconductor.*]

◇ G. Liang, H. Fang, Z. P. Luo, C. Hoyt, F. Yen, **S. Guchhait**, B. Lv, J. T. Markert, "Negative effects of crystalline-SiC doping on the critical current density in Ti-sheathed $MgB_2(SiC)_y$ superconducting wires", *Superconductor Science & Technology* **20**, 697 (2007). [*Study on the effects of SiC doping on superconducting properties of Ti-sheathed* MgB_2.]

◇ J.-H. Choi, U. Mirsaidov, C. Miller, Y. Lee, **Samaresh Guchhait**, M. Chabot, W. Lu, and J. T. Markert, "Oscillator Microfabrication, Micromagnets, and Magnetic Resonance Force Microscopy", *Proceedings of SPIE: Smart Electronics, MEMS, BioMEMS, and Nanotechnology*, Volume **5389**, page 399-410, July 2004.
[*Report on the advances in nuclear magnetic resonance force microscopy (NMRFM).*]

Skills

- Experience with nano-fabrication techniques;
- Experience with circuit quantum electrodynamics (cQED) physics and experiments;
- Experience with microwave and radio-frequency experiment techniques;
- Experience to operate both dry and wet dilution refrigerators and cryogenic systems;
- Experience with low noise measurements;
- Experience with basic NMR experiments;
- Software Skills: Matlab, Labview;
- *Magnetic Characterizations:* SQUID magnetometer, Magnetic Force Microscopy (MFM);
- *Electrical Characterizations:* Variable temperature (20 mK to 400 K) magneto-transport measurements from dc to microwave (GHz) frequency range;
- *Thin Film Deposition:* Ultra High Vacuum Chemical Vapor Deposition (UHV CVD), Evaporation and Sputter Deposition, Atomic Layer Deposition (ALD);
- *Structural Characterization:* Synchrotron X-ray Diffraction, Transmission Electron Microscopy (TEM);
- *Optical Characterization:* X-ray Photoelectron Spectroscopy (XPS), Ellipsometer;
- *Surface Characterization:* Atomic Force Microscopy (AFM), Scanning Tunneling Microscopy;
- Ultra High Vacuum (UHV) system design, setup and operation;

◇ *Experiment Design:* Design, debugging and operation of complex Nuclear Magnetic Resonance Force Microscopy (NMRFM) probe, which includes high vacuum system, high field (8T) magnet, very low temperature (4K) system, micro-cantilever, micro-magnet, laser interferometer, complex RF pulse generator, RF pulse amplifier and tank circuit, feedback system and related circuits, advanced data acquisition systems, etc;

◇ Experience to work in collaboration with other groups, including industries.

RESEARCH EXPERIENCE

- **Current Research at UMD: Study of Two-level Defect States by Circuit QED**
  Circuit quantum electrodynamics (cQED), also popularly known as superconducting quantum computing, is a very powerful technique to study fundamental interactions between light and matter. cQED has widely been used to study and manipulate quantum states of artificial atoms, two-level states (TLS), etc.

  cQED uses superconducting coplanar waveguides coupled with microwave resonators, which are consists of inductors and capacitors made out of superconductors and dielectrics. For dielectrics, we use either Al_2O_3 or SiN. However, any dielectric has defects which acts as two-level states at mili-Kelvin temperatures and have deleterious effects on the resonators.

  Using a novel bias-bridge design, we can apply time dependent electric field on the dielectric, which couples with its defect dipole moments and changes TLS energy with time. By using a simultaneous electric field bias and a strong microwave pump field, we have been able to invert significant numbers of TLSs. This in turn increases the quality factor of the resonator and also changes its dielectric permittivity. Any change of dielectric permittivity alters the capacitance (and hence resonance frequency) of the microwave resonator circuit.

  Using a weak probe tone, we have been able to detect this change ($\sim$ several MHz) of resonance frequency of a microwave resonator. Our findings agree well with a TLS model based on Landau-Zener theory. This is the first known study of change of dielectric permittivity in cQED. Our study might lead to *slow light* and *quantum memory* in cQED settings.

  Publication: "Resonator Dressed State Control Using Broadband Two-level Defects Inversion", manuscript under preparation to be submitted to *Physical Review Letters.*

- **Mesoscale Spin Glass and its Properties** [Univ. of Texas at Austin]
  We have used thin films Ge:Mn spin glass for some path breaking research on spin glass state, such as verification of lower critical dimension of spin glass. This is the first direct evidence that spin glass lower critical dimension $2 < d_l < 3$. We have also shown that ultrametricity holds for short-range interaction. Using this material, at present we have studied the (lower) limit of ultrametricity. We have also used these films to show the existence of elusive temperature chaos in spin glasses. Recently we have accurately determined the field dependence of spin glass free energy barriers.

Publications: *Physical Review Letters* **118**, 157203 (2017); *Physical Review B* **92**, 214418 (2015); *Physical Review B* **91**, 014434 (2015); *Physical Review Letters* **112**, 126401 (2014).

- **Topological Insulators** [Univ. of Texas at Austin]

  Topological insulators (TI) are a unique class of materials that behaves like an insulator in the interior, while permitting movement of charge / electric current on its surface. It is a very interesting material for studying fundamental physics (Majorana fermions, magnetic monopoles, etc), as well as for exciting applications, including spintronics, magneto-electric devices, defect tolerant electronics, etc.

  Using molecular beam epitaxy (MBE), we grow thin films of two topological insulators: Bi_2Se_3 and Bi_2Te_3. Then using XRD, XPS, and AFM, we characterize the surface and crystallinity of these films. Using a low temperature Hall setup, we then perform low temperature magneto-transport measurements on these films to find surface charge carrier density and mobility. At present we are using these material for electronics applications.

  One can exploit spin polarized transport on TI surfaces, and examine the coupling with magnets. Strong spin-orbit coupling locks the electron spins of TI surface states to the surface plane at a near-fixed negative 90° angle relative to the transport direction. Among other things, this spin locking offers a mechanism for transduction between charge and spin transport, and provides a near-perfect spin Hall effect, and with no parasitic bulk transport. In combination with nanomagnets of different shapes, TI might provide new opportunities for existing and new spin-based nonvolatile logic and memory concepts, such as spin-Hall-effect-based spin-torque switching of nanomagnets. In addition, possibility of gate voltage control of TI surfaces offers opportunities of exciting new applications.

  Recently we have shown that it is possible to reverse the magnetization of ∼1 micron-size magnets grown on Bi_2Te_3 (a TI materials) surface by spin-transfer torque from TI surface states at 2 K. However, this spin transfer-torque switching works well only in very low temperatures (below 10 K). We believe that is mainly due to presence of large bulk conductions at higher temperatures in these exfoliated TI materials. Hence it is now very important to find new TI materials with reduced bulk conductions. That will enable it to observe this effect at higher temperatures.

  Publications: *Journal of Applied Physics* **120,**, 164301 (2016); *IEEE Transactions on Nanotechnology* **15**, 671 (2016); *Appl. Phys. Lett.* **104**, 223111 (2014); *Appl. Phys. Lett.* **102**, 163118 (2013).

- **Transition Metal Dichalcogenides (TMDs)** [Univ. of Texas at Austin]

  TMDs are atomically thin semiconductors of MX_2 type, where M is a metal and X is a chalcogen atom. We have grown chromium telluride by MBE and studied temperature dependent magnetic, transport and magneto-transport properties. We have shown that these materials have spin glass phase and perpendicular magnetic anisotropy properties. We have also done details structural analysis of these materials.

Publications: *J. Magn. Magn. Mater.* **437**, 72 (2017); *ACS Applied Materials & Interfaces* **8**, 7396 (2016); *Nano Letters* **15**, 4329 (2015); *ACS Nano* **9**, 3772 (2015).

- **Group IV Dilute Magnetic Semiconductors** [Univ. of Texas at Austin]
  Main goal of this project is to investigate magnetic, structural and transport properties of Mn-implanted Si, Ge, SiGe, GeC etc. thin films, grown by an ultra-high vacuum chemical vapor deposition system. We use SQUID magnetometer and XMCD to determine magnetic ordering in these thin films. We also use TEM and XRD to determine its structure and XPS and SIMS to determine its chemical compositions.

  We have successfully solved the problem of separating real magnetic semiconductor signal from unwanted magnetic impurity signal. We have also determined profile, dose and energy of ion implant. We have suggested ways to improve Curie temperature and saturation magnetic moment of group IV magnetic semiconductors. We have shown that while amorphous phase of Ge:Mn is ferromagnetic, crystalline phase is paramagnetic.

  Publications: *Phys. Rev. B* **84**, 024432 (2011); *Appl. Phy. Lett.* **102**, 192111 (2013); *Microscopy and Microanalysis* **15**(S2), 1216 (2009).

- **Doctoral Research: Nuclear Magnetic Resonance Force Microscopy (NMRFM)**
  The NMRFM is a unique quantum microscopy technique, which combines the three-dimensional imaging capabilities of magnetic resonance imaging (MRI) with high sensitivity and resolution of atomic force microscopy (AFM). It has potential applications in many different fields. This novel scanned probe instrument also holds clear potential for atomic-scale resolution.

  MgB_2 is a classic example of two-band superconductor. However, the behavior of these two bands below the superconducting transition temperature is not well understood yet. Also the relaxation times of single crystal MgB_2 can not be measured because it is not yet possible to grow big enough MgB_2 single crystal for conventional NMR. Using our homemade NMRFM probe, I have tried to measure the relaxation times of micron size MgB_2 single crystal to answer several questions relating to this unusual superconductor.

  To perform NMRFM experiment, I have successfully solved many problems associated with low temperature, sample-magnet-cantilever alignment, laser induced heating, fringe lock at low temperature, RF circuit, power and field problems, RF frequency modulations, cantilever Q-factor change, micron size sample mounting and alignment, etc. We have also developed simple pulse program and related electronic circuits for magnetization locking during adiabatic inversion of sample magnetic moment. I have successfully conducted force detected magnetic resonance experiment of ^{11}B nuclei.

Publications: *Proceedings of SPIE: Smart Electronics, MEMS, BioMEMS, and Nanotechnology*, Volume **5389**, page 399-410, July 2004; *Superconductor Science & Technology* **20**, 697 (2007); *Advances in Cryogenic Engineering* **56**, 281 (2010).

Invited Talks

- "Resonator Dressed State Control Using Broadband Two-Level Defect Inversion", *Purdue University,* West Lafayette, Indiana, USA (May 2, 2018).
- "Turning Material Defects into a Solution for Quantum Computation", *Howard University,* Washington, DC 20059, USA (April 25, 2018).
- "Broadband Two-Level Defects Inversion Measured Through Dressed Resonator Frequency and Dielectric Loss", *National Institute of Standards and Technology,* Gaithersburg, Maryland, USA (March 27, 2018).
- "Direct Observation of Temperature Chaos in Mesoscopic Spin Glasses", *Indian Association for the Cultivation of Science,* Kolkata, India (January 13, 2017).
- "Observation of Temperature Chaos in Mesoscopic Spin Glasses", *American Physical Society March Meeting,* Baltimore, Maryland, USA (March 14-18, 2016).
- "Ordered Dynamics in Spatially Random Systems Through SQUID Magnetometry", *Laboratory for Physical Sciences, University of Maryland,* College Park, MD (April 27, 2015).
- "Putting the Spin on Graphite: Ordering of Impurity Atoms in HOPG Substrates", *Gordon Research Seminar* on Chemistry and Physics of Graphitic Carbon Materials (June 15, 2014).
- "Magnetic Resonance Force Microscopy: A Unique Quantum Microscopy", Indian Institute of Technology, Kharagpur, India (July 15, 2009).
- "Magnetic Resonance Force Microscopy: A Unique Quantum Microscopy", S.N. Bose Center for Basic Sciences, Kolkata, India (July 8, 2009).
- "Strongly Correlated Systems: Magnetic Measurements of Magnesium Diboride and Group IV Ferromagnetic Semiconductor Alloys", Indian Institute of Science Education and Research, Kolkata, India (July 1, 2009).
- "Strongly Correlated Systems: Measurements of Magnesium Diboride Nuclear Magnetism and Group IV Magnetic Semiconductors", Brookhaven National Laboratory, New York, USA (October 24, 2007).

CONFERENCE PRESENTATIONS

- ◇ **S. Guchhait**, Y. Rosen, A. Burin and K. Osborn, "Broadband Two-Level System Defects Inversion Measured Through Dressed Resonator Frequency and Dielectric Loss", *APS March Meeting*, Los Angeles, California, USA (March 5-9, 2018).
- ◇ **S. Guchhait**, Y. Rosen, A. Burin and K. Osborn, "Probing the permittivity from two-level system defects which are manipulated in population and swept in energy using a superconducting resonator", *APS March Meeting*, New Orleans, Louisiana, USA (March 13-17, 2017).
- ◇ **S. Guchhait**, and R. Orbach, "Magnetic Field Dependence of Spin Glass Free Energy Barriers", *APS March Meeting*, New Orleans, Louisiana, USA (March 13-17, 2017).
- ◇ S. Mozaffari, **S. Guchhait**, and J Markert, "Spin-Orbit Interaction and Kondo Scattering at the $PrAlO_3/SrTiO_3$ Interface", *APS March Meeting*, New Orleans, Louisiana, USA (March 13-17, 2017).
- ◇ T. Kohler, Y. Rosen, **S. Guchhait** and K. Osborn, "A qubit designed with a dynamically controlled bath of two-level system defects", *APS March Meeting*, Baltimore, Maryland, USA (March 14-18, 2016).
- ◇ Y. Rosen, **S. Guchhait**, A. Burin and K. Osborn, "Device Applications for the Tunneling Atom Maser", *APS March Meeting*, Baltimore, Maryland, USA (March 14-18, 2016).
- ◇ P. Xu, T. Kohler, E. Lock, Y. Rosen, A. Ramanayaka, **S. Guchhait** and K. Osborn, "Anomalous thickness dependence of quality factor in TiN film resonators grown on functionalized Si substrates", *APS March Meeting*, *APS March Meeting*, Baltimore, Maryland, USA (March 14-18, 2016).
- ◇ **Samaresh Guchhait** and Raymond Orbach, "Spin Glass Dynamics: Finite Size Effects", *APS March Meeting*, San Antonio, Texas, USA (March 2-6, 2015).
- ◇ A. Roy, **S. Guchhait**, *et al.*, "Magnetic and magneto-transport studies of MBE grown Cr_2Te_3 thin films with perpendicular magnetic anisotropy", *APS March Meeting*, San Antonio, Texas, USA (March 2-6, 2015).
- ◇ R. Dey, A. Roy, T. Pramanik, **S. Guchhait**, *et al.*, "Low temperature magnetoresistance studies in MBE grown topological insulator thin films", *APS March Meeting*, San Antonio, Texas, USA (March 2-6, 2015).
- ◇ S. Mozaffari, M. Monti, **S. Guchhait**, *et al.*, "Electronic Transport Properties of the $PrAlO_3/SrTiO_3$ Interface: Effects of Oxygen Pressure", *APS March Meeting*, San Antonio, Texas, USA (March 2-6, 2015).

◇ R. Salas, **S. Guchhait**, *et al.*, "Properties of Growth Enhanced ErAs:InGaAs Nanocomposites", *Electronic Materials Conference*, Columbus, Ohio, USA (June 24-26, 2015).

◇ **Samaresh Guchhait** and Raymond Orbach, "The Parcolation Topology: Dynamical Correlations in Re-entrant Spin Glasses", poster presentation at *Gordon Research Conference* on Correlated Electron Systems, South Hadley, MA (June 21-27, 2014).

◇ R. Salas, **S. Guchhait**, S.D. Sifferman, K.M. McNicholas, V.D. Dasika, D. Jung, M.L. Lee, and S.R. Bank, "Surfactant-Mediated Growth of RE-As:InGaAs Nanocomposites", *International Molecular Beam Epitaxy Conf. (IMBE)*, Flagstaff, AZ (September 2014).

◇ R. Salas, **S. Guchhait**, S.D. Sifferman, K.M. McNicholas, V.D. Dasika, E.M. Krivoy, S.J. Maddox, and Seth.R. Bank, "Properties of RE-As:InGaAs Nanocomposites", *56th Electronic Materials Conf. (EMC)*, Santa Barbara, CA (June, 2014).

◇ **Samaresh Guchhait** and Raymond Orbach, "Experimental Determination of Spin Glass Lower Critical Dimension", *APS March Meeting*, Denver, USA (March 3-7, 2014).

◇ R. Salas, **S. Guchhait**, H.P. Nair, E.M. Krivoy, S.J. Maddox, and S.R. Bank, "Carrier Dynamics and Electrical Properties of LuAs:InGaAs Superlattices", *55th Electronic Materials Conf. (EMC)*, South Bend, IN, USA (June, 2013).

◇ Anupam Roy, Sushant Sonde, **Samaresh Guchhait**, and Sanjay K. Banerjee, "Growth of topological insulators on Si(111)-(7×7) surfaces by molecular beam epitaxy", *APS March Meeting*, Baltimore, USA (March 18-22, 2013).

◇ **Samaresh Guchhait**, Sanjay K. Banerjee and Raymond L. Orbach, "Spinglass Dynamics of Amorphous Ferromagnetic Ge:Mn", *APS March Meeting*, Boston, USA (February 27-March 2, 2012).

◇ **Samaresh Guchhait** *et al.*, "Ferromagnetism in Mn-implanted HOPG", *APS March Meeting*, Dallas, USA (March 21-25, 2011).

◇ **Samaresh Guchhait** *et al.*, "Shape-dependency of magnetic properties of FePt nanostructures", *APS March Meeting*, Portland, USA (March 15-19, 2010).

◇ **Samaresh Guchhait** *et al.*, "Mn-implanted GeC: An Amorphous Ferromagnetic Material", *APS March Meeting*, Pittsburgh, USA (March 16-20, 2009).

◇ G. Liang, H. Fang, C. Hoyt, **Samaresh Guchhait**, J. Markert, "Effects of sintering temperature on properties of Ti-sheathed, SiC-doped MgB_2 superconducting wires", *APS March Meeting*, Pittsburgh, USA (March 16-20, 2009).

- ◇ **Samaresh Guchhait** *et al.*, "Ferromagnetism in Mn-implanted Ge and epitaxial GeC", *APS March Meeting*, New Orleans, USA (March 10-14, 2008).
- ◇ M. Jamil, **S. Guchhait**, D. Ferrer, J. Markert, E. Tutuc, L. Colombo, and S. K. Banerjee, "Ferromagnetism in Mn Implanted Epitaxially Grown Ge:C Layers on Si (100)", *TECHCON*, Austin, Texas, USA (2008).
- ◇ M. Jamil, **S. Guchhait**, J. Markert, E. Tutuc, L. Colombo, and S. K. Banerjee, "Ferromagnetism in Mn implanted epitaxially grown Ge:C layer on Si (001) substrate", *Electronic Materials Conference*, (2008).
- ◇ H J Chia, W Lu, **Samaresh Guchhait**, R Cardenas, I Esteve, M Millan, J Markert, "Experiments using force-detected nuclear magnetism", *APS March Meeting*, Denver, Colorado, USA (March 5-9, 2007).
- ◇ Y. Lee, W. Lu, J.-H. Choi, H.J. Chia, U.M. Mirsaidov, **S. Guchhait**, A.D. Cambou, R. Cardenas, K. Park, J.T. Markert,"Experiments in Nuclear Magnetic Resonance Microscopy", *APS March Meeting*, Baltimore, USA (March 13-17, 2006).
- ◇ J. T. Markert, A. D. Cambou, J.-H. Choi, **S. Guchhait**, Y. J. Lee, W. Lu, U. M. Mirsaidov, "Magnetic Resonance Force Microscopy and Force-Detected NMR of Microcrystals", *American Physical Society March Meeting*, Los Angeles, USA (2005).
- ◇ J. H. Choi, C. W. Miller, **S. Guchhait**, M. D. Chabot, and J. T. Markert, "Nuclear magnetic resonance force microscopy of $(NH_4)_2SO_4$ crystal and PMMA thin film", *American Physical Society March Meeting*, Montreal, Canada (2004).

Workshops Attended

- ⋄ *New Trends in Frustrated Magnetism*, 4th Theory Winter School, The National High Magnetic Field Laboratory, Tallahassee, Florida, USA (January 5-9, 2015).
- ⋄ *Correlated Electron Systems*, Gordon Research Conferences and Seminars, South Hadley, Massachusetts, USA (June 21-27, 2014).
- ⋄ *Chemistry and Physics of Graphitic Carbon Materials*, Gordon Research Conferences and Seminars, Lewiston, Maine, USA (June 14-20, 2014).
- ⋄ *NewSpin 2*, College Station, Texas, USA (December 12-17, 2011).
- ⋄ *European School on Magnetism*, Timisoara, Romania (September 1-10, 2009).

Academic Service

- ⋄ Referee for Journal of Physics D: Applied Physics, Journal of Physics: Condensed Matter, Journal of Electronic Materials (JEMS), AIP Advances, Current Applied Physics and Materials Today.