DMP NEWSLETTER
Division of Materials Physics
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# CALL FOR INVITED SPEAKER SUGGESTIONS

Please find below the Division of Materials Physics Focused Topic program for the 2002 APS March Mtg. (Indianapolis, IN; March 18-22, 2002). Focused Topics include a number of sessions per topic with typically 1 invited speaker per session. The rest of the session consists of contributed presentations. If you would like to make suggestions for invited speakers, please contact the appropriate organizers (listed below) by Friday, Aug. 31, 2001. The format for your suggestions is free-style, but please include a title, a brief descriptive paragraph, and the name, address, telephone and fax number of both the proposed speaker and the nominator. This year there will also be a web-based response form that will be described in a separate e-mailing to the DMP membership. Contributed (and invited speaker) abstracts are due Dec. 7, 2001 at APS(submitted via web); contributors are welcome to send a duplicate copy to the organizers listed below, but please be sure to send the original to APS, on time, being sure that abstract conforms to APS regulations.

Note that it is likely that the printed version of this newsletter delivered via the postal system might not reach you in time for the Aug. 31 deadline, but we are also disseminating it electronically, so hopefully all interested members will have an adequate chance to participate in the process.

## DATES TO REMEMBER:

**Aug. 31, 2001:**
**Suggestions for Invited Speakers to organizers**

**Dec. 7, 2001:**
**Abstracts Deadline (submitted via web)**

**March 18-22, 2002:**
**March Mtg. in Indianapolis, IN**

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Understanding Molecular- and Nano- Electronics (FIAP/DMP) – 13.9.2

# CALL FOR ABSTRACTS

## DMP Focus Topics for March 2002 (listed by sorting category)

**Stress Driven Processes on the Nanoscale: Heteroepitaxial Films, Friction and Fracture (DMP) - 12.10.1**

Material response to stress, particularly near surfaces, plays a key role in heteroepitaxial growth, crack propagation and frictional sliding. Each of these fields confronts a common goal of understanding the origins of dynamical behavior and complex pattern formation to either eliminate or control intermittency (unstable fracture, stick-slip friction), localization (shear band formation, brittle fracture) or nonlinear stability (nanostructure formation, interfacial pulses, dynamically induced phase separation). Recent investigations in these areas have generated exciting work in modeling deformation mechanisms, understanding the consequences of stress driven diffusion and elucidating a complex variety of surface properties. Progress in these fields has benefited greatly from experimental advances that probe nanometer length scales and microsecond time scales coupled with the application of ab initio, molecular and mesoscale simulation techniques. This series of sessions will provide an opportunity for experimental, computational and theoretical investigators to consider overarching questions that remain outstanding in all three fields. Abstracts are solicited in the general areas of heteroepitaxial growth (morphological instabilities, surface properties, stress induced ordering), friction (characterization of surfaces, stick-slip mechanisms), fracture (dynamic instabilities, brittle-ductile transitions) and deformation (dislocation dynamics, dislocation structures, plastic flow in noncrystalline solids, shear localization).

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Brian Spencer, Department of Mathematics; University of Buffalo; Buffalo, NY 14260-2900; Tel: (716) 645-6284 x118; fax: (716) 645-5039; e-mail: spencerb@buffalo.edu

**Ice: Surface Structure and Dynamics (DMP) - 12.10.2**

Ice is a ubiquitous material in the environment and its various forms are now recognized to influence life on Earth in multiple ways. For instance, ice clouds affect the chemical composition and radiative budget of the atmosphere, ice sheets and glaciers influence local and global climate and geomorphic processes, and frozen groundwater causes frost heave in soils. Within this context, significant emphasis has been placed on the importance of physical and chemical processes occurring at ice surfaces, however, there is a continued need for further understanding the surface physics and chemistry of this high-vapor pressure molecular solid. Thus, in an effort to advance our existing knowledge of the physics and chemistry of ice surfaces, we are soliciting papers on the following topics: ice surface structure and dynamics, impurity effects on surface structure, mechanisms of growth and dissolution at ice surfaces, kinetics and thermodynamics of adsorption, diffusion, and desorption of foreign molecules, chemical reactions at ice surfaces, and photochemistry at ice surfaces. We emphasize both novel experimental and computational and theoretical approaches.

Organizers: Lucien N. Brush, Dept. of Materials Science and Engineering; Box 352120 - 325 Roberts Hall; The University of Washington; Seattle, WA, 98195; Tel.: (206) 543-7161; Fax: (206) 543-3100; e-mail: brush@u.washington.edu

Franz M. Geiger, Department of Chemistry K-332; Northwestern University; 2145 Sheridan Road; Evanston, IL 60208; Tel.: (617) 253-2321 (until July 1, 2001); Fax: (617) 253-2321 (until July 1, 2001); e-mail: geigerf@chem.nwu.edu

**High Tc Superconductors (DMP ) - 5.9.1**

"High-Temperature Superconducting Materials: Relations between Physical and Electronic Structure"

The objective of this Focus Topic is to explore recent developments in our understanding of the physical and electronic structure, and their interplay, in the high-temperature superconducting cuprates, and related unconventional superconductors. We seek contributions of timely results that cross-relate experimental results, particularly neutron scattering, photoemission, tunneling and magnetic measurements, with each other, and with theoretical models, to elucidate the nature of the phase diagram, the pseudogap, the normal and superconducting states, and the existence of quasiparticles. Abstracts describing experimental and theoretical work that elucidates the interrelationship between physical and electronic properties are particularly encouraged.

Organizers: Laura H. Greene, Department of Physics; University of Illinois at Urbana-Champaign; Urbana, IL, 61801; Tel: (217) 333-7315; Fax: (217) 244-8544; e-mail: lhg@uiuc.edu

Michael R. Norman, Materials Science Division, Argonne National Laboratories, Tel: (630) 252-3518, Fax: (630) 252-7777; e-mail: norman@anl.gov

Herbert A. Mook, Solid State Division; Oak Ridge National Laboratory; Tel: (865) 574-5242; Fax: (865) 574-6268; e-mail: mookhajr@ornl.gov

**Magnetic Nanostructures and Heterostructures (DMP/ GMAG) — 6.9.1**

This session will be focused on the properties of artificial magnetic structures characterized by reduced dimensions at the nanometer length scale. Types of structures include films,

superlattices, multilayers, nanocomposites, heterostructures, spin valves, tunnel junctions, exchange-spring magnets, wedges, nanowires, magnetic point contacts, quantum dots, particle arrays and patterned films. These magnetic structures may be composed, for example, of metals, insulators, magnetic semiconductors, half metals, perovskites or intermetallic compounds. This session will cover experimental and theoretical advances in low-dimensional magnetism, interlayer magnetic coupling, exchange bias, spin-dependent transport (especially giant magnetoresistance, tunneling magnetoresistance and spin injection), magnetic quantum confinement, magnetic anisotropy, effects of structural disorder, and other magnetic phenomena. Of special interest are the fabrication of nanostructures with atomic-scale control, high-resolution characterization methods with site and/or element specificity, novel techniques for the creation of nanoscale magnetic features, and unusual physical phenomena present in these systems.

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**Magnetoresistive Oxides (DMP/GMAG) - 6.9.2**

Mixed-valent manganese oxides known as colossal magnetoresistive (CMR) manganites exhibit a dramatic interplay among spin, charge, lattice, and orbital degrees of freedom. The result is a spectacular array of competing ground states that include ferromagnetic metals, antiferromagnetic insulators, charge- and orbital ordered states, and micro- and mesoscopic phase mixtures of these states. This focus topic will address fundamental aspects of such multiple ground states in manganites and related transition metal oxides (ruthenates, cobaltates, etc.). Contributions will include both experimental and theoretical studies of chemical, structural, and physical properties, emphasizing the static and dynamic aspects of magnetic, charge, and orbital ordering, the role of inhomogeneity on varying length scales, field-induced phenomena, and phase segregation. This focus topic will bring together wide-ranging efforts in the manganites and related transition metal oxides to highlight and unify the understanding of their fundamental physics.

Organizers: Professor Takeshi Egami, Department of Materials Science and Engineering; University of Pennsylvania; LRSM, 3231 Walnut Street; Philadelphia, PA 19104-6272; Tel: 215-898-5138; Fax: 215-573-2128; e-mail: egami@seas.upenn.edu

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**Clusters and Nano Assemblies (DMP) — 13.9.3**

The focused topics sessions on Clusters and Nano-Assemblies will include free atomic clusters, clusters supported on metallic and organic substrates, isolated in matrices, coated with organic ligands, as well as cluster assembled and self assembled nano-materials such as nano-wires and nano-composites. The topics will include experimental and theoretical studies of design, synthesis, characterization, and their electronic, magnetic, optical, and catalytic properties. Emphasis will be placed on systems where restricted geometry and length scales influence the properties and how these properties evolve upon one atom or one electron additions.

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**Nanotubes and Related Materials (DMP/FIA) — 7.9.1**

Carbon nanotubes exhibit exceptional electronic, mechanical, optical, and thermal properties which suggest potential applications as electronic components and multifunctional structural elements in composites. However, commercial application of carbon nanotubes and related materials awaits fundamental understanding of their synthesis mechanisms, their chemistry, and their charge transport, thermal, mechanical, optical and field emission properties. This session is focused on recent developments in the fundamental understanding of the growth mechanisms and properties of these unique materials. Experimental, theoretical, and computer modeling contributions are solicited in (but not limited to) the following areas:

- Atomistic nucleation, growth, and structural characteristics
- Growth and characterization of single-wall carbon nanotube single crystals
- Physical and chemical properties of individual nanotubes, nanotube bundles and nanotube solids
- Spectroscopy and optical properties
- Electronic and thermal transport properties
- Intercalation and adsorption
- C60, Nanotube peapods, and related materials
- Defects in nanotubes - Physical and chemical modification
- Nanotube synthesis - Growth diagnostics, high-volume production and purification
- Nanotube-based composites -Synthesis and characterization
- Science enabling technology - Studies of field emission, nanotube junctions and devices, nanoscale probes, and energy storage.

Organizers: Dr. David B. Geohegan, Solid State Division; Oak Ridge National Laboratory; P.O. Box 2008, MS-6056; Oak Ridge, TN 37831-6056; Tel.: (865) 576-5097; Fax: (865) 576-3676; e-mail: odg@ornl.gov

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**Nanostructured Materials for Enhanced Mechanical and Tribological Properties — (13.9.1)**

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**Organic Electronic Materials and Devices (DMP) - 4.14.6**

This focused session will be devoted to conjugated polymers and other organic materials for electronic and photopphysical applications. Both the fundamental science and applications of these materials will be addressed. Topics to be covered include, but are not limited to: characterization of the fundamental excitations; transport and other electrical properties; new materials; applications such as light-emitting diodes, photodetectors, solar cells, lasers and thin film transistors; and materials issues such as contacts, defects and mechanisms of aging and failure.

Organizers: Prof. Zoltan Soos, Department of Chemistry; Princeton University; Princeton, NJ 08544; Tel: (609)258-3931; Fax: (609)258-6746; e-mail: Soos@Chemvax.princeton.edu

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**Multifunctionality and Dynamics in Multiferroic Materials (DMP) - 3.9.1**

This session will focus on multiscale phenomena, including dynamics, in complex multifunctional materials such as shape memory alloys, magnetoelastics, ferroelectrics, dielectrics and relaxors as well as their composites in both thin film and bulk form. Materials that have a strong coupling between two or more magnetic, electric, and structural order parameters, resulting in simultaneous ferromagnetism and/or ferroelectricity and/or ferroelasticity, are known as multiferroics. Most multiferroic materials exhibit complex structures with many atoms per unit cell. The origin of multiferroic behavior and the nature of the coupling between the magnetic, electric polarization, dynamics and structural order parameters are not well understood.

Our approach is to merge techniques from traditional materials science, statistical physics and nonlinear condensed matter to relate materials texture to local (e.g. electronic or magnetic) functionalities and dynamics. This focused session aims at fostering dialogue among experimentalists and theorists, bringing scientists together from academia, national laboratories and industry, identifying key questions, and seeking broader understanding and a common language.

Organizers: Dr. Avadh B. Saxena, T-11, MS B262; Los Alamos National Lab; Los Alamos, NM 87545 USA; Tel: (505) 667-5227; Fax: (505) 665-4063; e-mail: avadh@lanl.gov

Prof. Wenwu Cao, Materials Research Lab; Penn State Unversity; University Park, PA 16802; Tel: (814) 865-4101; Fax: (814) 865-2326; e-mail: cao@math.psu.edu

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**Spin-Dependent Phenomena in Semiconductors (DMP) - 2.9.3**

Recent developments in the physics of spin-dependent phenomena in semiconductors have opened exciting new possibilities in semiconductor-based spin electronics and quantum computation. A number of seminal discoveries have occurred over the past three years, including the fabrication of ferromagnetic semiconductors such as (Ga,Mn)As with Tc as high as ~110 K, the demonstration of electrical spin injection using spin-LED structures and the observation of long coherence times associated with optically excited spin states in n-doped semiconductors. This focused session solicits abstracts that explore a fundamental understanding of spin processes in magnetic and non-magnetic semiconductor structures. Topics of particular interest include: crystal growth and nanofabrication of magnetic semiconductor and hybrid magnetic/semiconductor materials; highly polarized spin injection contacts; spin injection and transport in semiconductors, co-operative phenomena (ferromagnetism, antiferromagnetism, spin polarons) in magnetic semiconductors, electronic spin dynamics/spin coherence, spin-dependent tunneling, magneto-optical and optoelectronic effects, electronic band structure of magnetic semiconductors, and semiconductor spin-based devices.

Co-organizers: Michael E. Flatt□, Dept. of Physics and Astronomy; University of Iowa; Iowa City, IA 52242; Tel: (319) 335-0201; Fax: (319) 353-1115; e-mail: michael_flatte@mailaps.org

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Chris Palmstrøm, Chemical Engineering and Materials Science; 412 Washington Avenue SE; University of Minnesota; Minneapolis, MN 55455; Tel.: (612) 625-7558; e-mail: palms001@umn.edu

**Surfaces, Interfaces and Growth of Thin Films (DMP) - 14.9.1**

This session will explore the structure and kinetics of surfaces, interfaces, adsorbates and thin films. Topics of interest include:

- Surface reactions and selective growth processes
- Time-resolved studies of surface or interface kinetics
- Novel theoretical or experimental methods
- Evolution of thin film morphology
- Self-assembled and patterned structures
- Nucleation, growth and cluster dynamics
- Solid/liquid interface structure and reactions
- Interfaces of organic and/or biological materials
- Nanoscale surface structures and patterning methods
- Nanotribology, friction and flow
- Electronic, magnetic, optical, and transport properties in thin films and surface layers

Organizers: Peter Bennett, Department of physics and astronomy; Arizona State University; Tempe AZ 85287-1504; Tel: 480-965-9623 ; Fax: 480-965-7954; e-mail: peter.bennett@asu.edu

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**Wide band Gap Semiconductors (DMP) - 2.9.4**

Strong Interest in the physical, optical and electronic properties of wide bandgap semiconductors continues to be stimulated by emerging technologies, including visible to near UV emitters, solar blind detectors and high power and high frequency electronic devices. Applied and basic papers are solicited on theoretical and experimental aspects of bulk and epitaxial growth, electronic and optical properties and device development in III-Nitrides, II-VI compounds, SiC and diamond. Abstracts are encouraged in both bulk and low dimensional systems and materials grown by new or emerging growth techniques. Topics to be covered include materials growth, electronic and optical properties, roles of extended and point defects, all aspects of materials theory and device characterization and modeling.

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**The Search for Next Generation Transparent Conducting Oxides (DMP) - 7.9.2**

Over the past three years, the area of transparent conducting oxides (TCOs) has enjoyed a renaissance both in results and in interest. As a wide range of devices, including thin-film photovoltaics, flat-panel displays, electrochromic windows and all-oxide opto-electronics move to higher performance and larger areas, their needs for new and improved TCO materials increase. These needs include new, high-performance n-type materials, which demand higher electron mobilities and have the desired materials properties specific to the end applications. The development of p-type TCOs is also an exciting field, which could enable new approaches to the formation of contacts to important semiconductors to be developed. They could also lead to many opto-electronic devices based on all oxide p-n junctions. In all of these areas, a basic understanding of the inter-relationships between structure, defects, doping and the opto-electronic properties is just beginning to emerge. The "holy grail" may be the development of amphoteric systems, which can be, doped both n- and p-type. Indeed, recent results from Japan suggest that ZnO and CuInO2 may already have exhibited amphoteric behavior. The tremendous surge of current activity in this area worldwide is leading to a variety of exciting new fundamental and applied results.

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**Non-linear Optical Interactions with Solids:Ultra-fast Spectroscopy and Materials Modification (DMP) — 14.9.2**

The field of laser material interactions is being transformed by the advent of practical, robust, sub-picosecond lasers and the subsequent development of novel surface, interface and bulk probes that exploit nonlinear effects. We solicit contributions addressing fundamental issues regarding the interaction of femptosecond laser pulses to study electronic properties, including thermal and electronic relaxation effects, the production of electronic and lattice defects, and adsorption/desorption processes. Contributions are also sought that clarify or exploit nonlinear optical effects at surfaces and interfaces, including second harmonic generation (SHG), sum frequency generation (SFG), four wave mixing (FWM), two-photon photoemission (2PPE) and related techniques. Realizing that these interactions not only probe but also modify surfaces, fundamental contributions treating surface modification or processing by laser interactions are also sought, including the generation or destruction of defects, time-resolved studies of surface melting, resolidfication and alloying, and laser-induced changes in polymer adhesion and chemistry.

Organizers: Norman H. Tolk, Professor of Physics; Vanderbilt University; Department of Physics and Astronomy; Box 1807-B; Nashville TN 37235,; Tel: (615) 322-2786; Fax: (615) 343-7108; e-mail: norman.tolk@vanderbilt.edu

J. Thomas Dickinson, Professor of Physics and Materials Science, Washington State University, Department of Physics,

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**Synthesis and Characterization of Novel Oxides and Boride Compounds (DMP) - 7.9.3**

Abstracts are sought for a series of focused sessions on the synthesis and characterization of novel boride and oxide materials. These sessions will not only focus on the basic physical properties but will also focus on the growth, characterization and possible applications of novel oxides and borides. Themes of interest for these sessions (for oxides) include, but are not limited to, ferroelastic, ferroelectric, thermoelectric, magnetic, magnetoresistive, magnetoelastic and superconducting oxide materials, transparent conducting oxides, oxygen fast-ion conductors (e.g., as used in solid oxide fuel cells), oxide heavy Fermion compounds, and framework oxides that exhibit negative thermal expansion. For borides topics include, but are not limited to: superconductivity (such as RNi2B2C, MgB2, RRh4B4), anomalous magnetism and heavy fermion behavior (such as RB4, RB6, RB12), high strength materials, and high conductivity metals. Other physical properties associated with novel oxide or boride materials are also of interest.

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**Excited State Electronic Structure and Response Functions (DMP) - 17.9.1**

In the last few decades, electronic structure theory and computations have achieved enormous successs in describing ground-state properties of materials. In contrast, quantitative descriptions of excitations and response functions from first principles received much less attention. The situation has however been dramatically altered with recent developments in new methods and algorithms such as those based on the GW approximation, TDLDA, and others. This focused session will be devoted to techniques to predict and understand the optical, photoemission, x-ray absorption, and other spectroscopic properties of materials. The emphasis will be on current topics and applications. Contributions from both theory and experiment are encouraged. Topics of interest will include, but are not limited to

- optical and dielectric (including nonlinear response) properties of semiconductors, insulators and oxides
- electron and x-ray spectroscopies via x-ray absorption, emission, and scattering;
  applications to metals, surfaces, and complex systems
- electronic excitations in confined systems, e.g., polymers, clusters, nanocrystals, quantum dots, and nanostructured materials

Co-organizers: James R. Chelikowsky; Institute of Technology Distinguished Professor; Amundson Hall, Room 283; Department of Chemical Engineering and Materials Science; University of Minnesota; 421 Washington Avenue, SE; Minneapolis, MN 5545; Tel.: (612) 625-4837; Dept.: (612) 625-1313; Fax: (612) 626-7246; Fax Modem: (612) 625-4837; e-mail: jrc@msi.umn.edu

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**Transport in Nanostructures and Ultrathin Films (DMP/FIAP) — 14.9.3**

Milestones in condensed matter and materials physics are most often associated with discoveries of novel transport phenomena, frequently encountered in materials of considerable chemical and structural complexity and reduced dimensionality. The last five years have been witness to impressive advances in understanding and utilization of electrical transport phenomena in structures that have been downsized to atomic dimensions, such as ultrathin films, interfaces, (arrays of) atomic wires and quantum dots, and even single atoms and molecules. The transport properties of such systems depend strongly on the geometry, temperature, structure, and structural defects in these systems. The aim of this focused session is to bring together researchers with expertise in thin film growth, nanoscience, and electrical transport to discuss the correlation between chemical composition, structure and transport in these low-dimensional materials. Topics of interest include, but are not limited to: synthesis and structural characterization of nanostructures of all classes of materials, thin film growth, self-assembly, quantum-size effects, (quantum)-ballistic transport, and break junctions. Theoretical contributions on the atomic and electronic properties, thermodynamic and kinetic stability, and electrical transport properties of nanostructures and thin-film materials are also solicited.

Organizers: Hanno H. Weitering, Department of Applied Physics and DIMES; Delft University of Technology; Lorentzweg 1; 2628 CJ Delft, THE NETHERLANDS; Tel: (31)15-2786297; Fax: (31)15-2781413; e-mail: hanno@dimes.tudelft.nl

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**Defects and Radiation Effects in Electronic Materials and Devices (FIAP/DMP) - 2.9.1**

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**Thermoelectric Materials and Novel Thermoelectric Phenomena (FIAP/DMP) - 7.9.4**

Organizers: George S. Nolas, R&D Division; Marlow Industries, Inc.; 10451 Vista Park Road; Dallas, TX 75243; Tel: (214) 503-3363; Fax: (214) 342-6863; e-mail: gnolas@marlow.com

Prof. Terry M. Tritt; Dept. of Physics and Astronomy; Clemson University; Clemson, SC 29634; Tel: (864) 656-5319; Fax: (864) 656-0805; e-mail: ttritt@clemson.edu

**Physics of Chemically Modified Interfaces (DCP/DMP/DCMP) - 11.9.8**

Chemical modification of interfaces is a means to many ends including molecular electronics, ultrathin gate dielectrics, tribology. Recently, there has been considerable effort to use the methods of synthetic chemistry to modify the properties of interfaces, leading to the creation of new systems and the observation of novel physical phenomena. Our goal is to foster interactions and exchange between members of this diverse community, as well as between theorists and experimentalists. Topics of interest include but are not limited to:

- Novel probes of chemicaly modified interfaces
- Dynamics of charges at chemically modified interfaces
- Electron transmission through chemically modified interfaces
- Devices based on chemically modified interfaces
- Nanostructured chemically modified interfaces
- Chemically modified nanoparticles
- Biological surfaces

**Abstracts in all areas related to physics of chemically modified interfaces are encouraged. This session is joint with DCM and CM.**

Organizer: Dr. Eric Borguet, Department of Chemistry & Surface Science Center, University of Pittsburgh, 219 Parkman Avenue; Pittsburgh PA 15260; Tel: (412) 624-8304; Lab: (412) 624-8305; Fax: (412) 624-8611; e-mail: borguet+@pitt.ed

**Disorder Controlled Interfaces in Condensed Matter: Properties, Characterization and Implications (DMP) —12.10.3**

Dynamics and structure of such vastly diverse interfaces, as magnetic, ferroelectric, or ferroelastic domain walls, surface growth, invasion of porous media by fluids, firefronts or fluxfronts, or directed polymers and vortices in superconductors, are intrinsically linked. Seemingly unrelated, the interfaces share an important common feature, namely the ubiquitous kinetically roughened edges that are a subject of interdisplinary branch of nonequilibrium statistical mechanics. Such edges or lines are of critical importance in a plethora of practical applications ranging from the control of magnetization reversal processes in nanostructures and enhancement of critical currents in superconductors to growth of atomically smooth ultrathin films. We will focus on recent developments in our understanding of the physics and materials science of interfaces subject to disorder. Abstracts are solicited on techniques characterizing the disorder and the 'depinning transitions' observed in a variety of driven systems, and on physical measurements and theory which are relevant to these phenomena. Attempts to understand all the effects controlling the threshold depinning behavior are encouraged, and in particular, we welcome reports on thin magnetic and ferroelectric films, and on superconductors. Some areas which could be emphasized are a connection of scaling properties of such quantities as surface roughness to interface dynamics, including thermally activated and glassy behaviors. In this connection, papers on diagnostic imaging methods of interfaces, such as magneto-optics, near-field scanning microscopy or STM are very relevant. We solicit abstracts on experimental, theoretical and numerical studies of the role of interface dimensionality, metastable states, and disorder-driven transitions, as well as hysteretic, aging and memory effects. Understanding the role of disorder on coupling across the (anti) ferromagnetic interfaces, and on tunneling and magneto-transport, is of great interest.

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**Understanding Molecular- and Nano- Electronics (FIAP/DMP) - 13.9.2**

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