

2022 Materials with Extreme Properties and Condensed Matter Physics Joint Review

Drs. Ali Sayir/Jiwei Lu | June 13-17, 2022 | Arlington, VA (hybrid)

Agenda Day 1 | Monday, June 13, 2022

| Time | Topic | Speaker |
|-------|--|---------------------------------------|
| 8:30 | Check in / Login | |
| 9:00 | Welcome remarks | |
| 9:15 | High Performance Evaporators for Extreme Thermal Management | E. N. WANG MIT |
| 9:45 | Advancing Graph Techniques for Mathematical Modeling of Particle Shape and Packing | V. SUNDARARAGHAVAN UNIV. MICHIGAN |
| 10:15 | BREAK | |
| 10:30 | Field-Assisted and Interfacial-Liquid-Activated Materials Processing and Far-from-Equilibrium Microstructural Evolution | J. LUO UCSD |
| 11:30 | Optimizing reversal in magnetic nanowires (MNWs) for localized heating. | B. STADLER UNIVERSITY OF MINNESOTA |
| 12:00 | LUNCH | |
| 13:00 | Search for Deep Center Defects for Quantum Applications in ZnSe | D. IRVING NCSU |
| 13:30 | Quantum Sensing and Imaging of Quantum Materials | C.H. DU UCSD |
| 14:00 | Unraveling Ultrafast Dynamics of Magnetic Heterostructures | R. KUKREJA UC DAVIS |
| 14:30 | BREAK | |
| 15:00 | Measuring Atomic Scale Charge and Magnetization via 4D-STEM | P. HUANG UIUC |
| 15:30 | Terahertz Electron Paramagnetic Resonance Ellipsometry: A new tool to characterize defect spins in materials with extreme properties | M. SCHUBERT UNIV. NEBRASKA-LINCOLN |
| 16:00 | MEETING ADJOURN | |

| Agenda Day 2 Tuesday, June 14, 2022 | | |
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| Time | Topic | Speaker |
| 8:30 | Check in / Login | |
| 9:00 | A New Materials Platform for Room-Temperature Control of Quantum Coherence | M. B. RASCHKE UNIV. COLORADO |
| 9:30 | Discovering New Atomically Laminated Transition Metal Borides with Diverse Properties | D. CAKIR UNIV. NORTH DAKOTA |
| 10:00 | | |
| 10:30 | BREAK | |
| 11:00 | UNDO-Phase: UNcertainty-DOMinated Phase Transitions in Magnetic Materials: Investigating 2-D Lattices | P. ACAR VIRGINIA TECH |
| 11:30 | Time-Reversal Symmetry Breaking And Spin Polarization In 2D Material | O. L. A. MONTI UNIV. ARIZONA |
| 12:00 | LUNCH | |
| 13:00 | Functional Nanostructured Strongly Correlated Solids | I. SCHULLER UCSD |
| 13:30 | Extreme Nonlinearity in Transition Metal Oxides | A. Demkov and J. Ekerdt UT AUSTIN |
| 14:00 | BREAK | |
| 14:30 | Poster Session I (see the list attached at the end) | |
| 17:00 | MEETING ADJOURN | |

| Agenda Day 3 Wednesday, June 15, 2022 | | |
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| Time | Topic | Speaker |
| 8:30 | Check in / Login | |
| 9:00 | Irrational Crystalline Interfaces And Implications on Slip-Emission under Phase-Transformations | H. SEHITOGLU UIUC |
| 9:30 | Semiconducting AlN: A New Pathway to High Voltage, Power and Temperature Ultra-Wide Bandgap Power Electronic Components | W. DOOLITTLE GIT |
| 10:00 | Growth and Characterization of Gallium-Oxide Epitaxial Films for High Performance Contact Structures | R.V. CHINTALAPALLE AND L.M. PORTER UTEP & CMU |
| 10:30 | BREAK | |
| 11:00 | All-Optical Transformations Performed Using Diffractive Materials | A. OZCAN UCLA |
| 11:30 | Quantification of Atom Probe Tomography Data | W. WINDL AND E. MARQUIS OSU / UNIV. MICHIGAN |
| 12:00 | LUNCH | |
| 13:00 | Effects of Disorder on the Ferroquadrupole State in TmVO ₄ | I. FISHER STANFORD |
| 13:30 | Electron-Phonon Renormalization Tuned Pyroelectricity in Nanomembranes | J. SHI RPI |
| 14:00 | BREAK | |
| 14:30 | LiHoxY _{1-x} F ₄ : Dipole-Coupled Ising Magnets | D. SILEVITCH CAL TECH |
| 15:00 | The Electronic Structure of a Correlated Interface | C. AHN YALE UNIV. |
| 15:30 | Molecular Quantum Crystals: Tunable Optical Anisotropy of 2D Molecular Crystals on TMDs | J. W. PARK U. CHICAGO |
| 16:00 | MEETING ADJOURN | |
| 17:30 | No Host Networking | |

| Agenda Day 4 Thursday, June 16, 2022 | | |
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| Time | Topic | Speaker |
| 8:30 | Check in / Login | |
| 9:00 | Optical Response of Two-Dimensional Dirac Materials With a Flat Band | Y-C LAI ASU |
| 9:30 | Complex Charge Density-Waves and Superconductivity in Kagome Metals | R. FERNANDES UNIV MINNESOTA |
| 10:00 | Dislocations as Nature's Quantum Wires | M. GHAZISAEIDI OSU |
| 10:30 | BREAK | |
| 11:00 | The $\nu = 0$ Quantum Hall State of a Topological Insulator | S. STEMMER UCSB |
| 11:30 | Towards Microwave Impedance Microscopy at Millikelvin Temperatures | MONICA ALLEN UCSD |
| 12:00 | LUNCH | |
| 13:00 | Light-Matter Interactions and Many-Electron Excitations in Quantum Materials | L. YANG WUSTL |
| 13:30 | Electron-phonon Coupling and Temperature Effects on Wide Band Gap Material Ga_2O_3 : Exploring Consequences for Operating Performance and Breakdown_ | E. ERTEKIN UIUC |
| 14:00 | BREAK | |
| 14:30 | Poster Session II (see the list attached at the end) | |
| 17:00 | MEETING ADJOURN | |

| Agenda Day 5 June 17, 2022 One-on-one with PO | | |
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| 8:30 | Check in / Login | |
| | Dr. Ali Sayir | Dr. Jiwei Lu |
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| 12:00 | | |
| 13:00 | MEETING ADJOURN | |

| In-person Poster Session I : Tuesday, June 14, 2022 (14:30 to 17:00) | |
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| Title | Presenter |
| Millimeter Wave Interactions with High Temperature Materials | Z. COHICK AFRL |
| Magneto-Optical Composite Materials With Tunable And Zero Net Magnetization | A. CHABANOV USTA |
| In Situ Nanoscale Visualization Of Peritectic Reactions | A. J. SHAHANI UNIV. MICHIGAN |
| Quantifying The Defect Character Of Grain Boundaries With Traction-Based Descriptors | H. B. CHEW UIUC |
| Formation and Characterization of 2D Mo ₂ C Crystals via Biased CVD | GÖKNUR CAMBAZ BÜKE TOBB UNIV. ECON & TECH |
| Vapor Phase-Assisted Sintering Of Transparent Yb ³⁺ :Lu ₂ O ₃ Laser Ceramics-- | J. EUN AND R. F. SPEYER GA TECH |
| Imaging and Manipulation of the Electronic Landscape of Material Surfaces via Atomic-Resolution Force Microscopy under Ambient Conditions | M. Z. BAYKARA AND A. MARTINI UC MERCED |
| Evolution of Anisotropy and Order of Band-to-band Transitions, Excitons, Phonons, Static and High Frequency Dielectric Constants including Strain Dependencies in Alpha and Beta Phase (Al _x Ga _{1-x}) ₂ O ₃ | M. SCHUBERT UNIV. NEBRASKA-LINCOLN |
| Optically Active Single-defect Spin-qubits in Wide Bandgap ZnSe | E. WAKS U. MARYLAND |
| Effect of Extreme Electric Fields on Thermal Transport in Wide-gap Semiconductors | B. LIAO UCSB |
| Growth and Characterization of Superconductivity in Group IV Semiconductor Thin Films | J. SHABANI NYU |

| Virtual Poster Session II: Thursday June 16, 2022 (14:30 to 17:00) | |
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| Title | Presenter |
| Strongly Correlated Electrons for Topological Quantum Phases | Q. SI RICE UNIV. |
| Defect Equilibration Studies in Binary Metal-Oxides | S. RAMANATHAN PURDUE UNIV. |
| Intertwined Topological and Magnetic Orders in Atomically Thin Chern Insulator MnBi ₂ Te ₄ | X. XU U. WASHINGTON |
| Effect of Ca and Zr Modification and Texturing on Electrocaloric Response for Barium Titanate Systems at the Critical Points | EBRU ALKOY AND BURCH MISIRLIOGLU GEBZE TECH AND SABANCI U. |
| Electromagnetically Induced Modification of Metal Optical Properties | MATTHEW BERG KANSAS STATE UNIV. |
| Quantifying the Defect Character of Grain Boundaries with Traction-based Descriptors | CHEW HUCK BENG UIUI |
| Ultrathin Topological Bismuth Crystals Grown Inside Van Der Waals Materials | J. SANCHEZ-YAMAGISHI UC IRVINE |

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| Multiferroic Heterostructures Towards High Frequency Acousto-Magnetic Electronics | M. R. PAGE AFRL |
| Tuning Magnetism and Superconductivity via Extreme Strain in Free-Standing Heusler Membranes | J. K. KAWASAKI UNIV. WISCONSIN, MADISON |
| High Temperature and Pressure Multicomponent Alloy Design | S. YANG SOUTHERN UNIV. AND A&M COLLEGE |
| Experimental Discovery of Kramers Nodal Lines and Weyl Points in SmAlSi | E. MOROSAN & M. YI RICE UNIV. |
| Semiconducting AlN: A New Pathway to High Voltage, Power and Temperature Ultra-Wide Bandgap Power Electronic Components | W. DOOLITTLE GIT |
| Quadrupolar Photogalvanic Spectroscopy as a Probe of Complex Matter | R. AGARWAL U. PENN |
| Quantum Magnetotransport in Two-Dimensional Quartic Materials- | H SEVINÇLI IZMIR INST. OF TECH. |
| Window Development Tools for Hypersonic Application | R. HAY AFRL |
| Low Emissivity Window | B. SLOVICK SRI |
| Exploring Light-Matter Interaction in Gallium Oxide Micro- And Nanostructures | B. MENDEZ UNIV Complutense Madrid |
| Fundamental Study of p-Type Doping in MOCVD-Grown Ga ₂ O ₃ | M. RAZEGHI NORTHWESTERN |
| Spectrally Selective Filters for Infrared Radiation with both Broadband and Narrowband Features | KURSAT SENDUR SABANCI UNIV. |
| Ion Channels in Geopolymers: Artificial Synapses with Unique Electro-mechanical Properties | C. LAMUTA UNIVERSITY OF IOWA |
| Creep and Functional Fatigue Behavior of NiTiHf High Temperature Shape Memory Alloys for High Temperature Applications | B. KOÇKAR HACETTEPE UNIVERSITY |
| Investigation of Electron Transport in β -(Al, Ga) ₂ O ₃ Thin Films | E. AHMADI UNIV. MICHIGAN |
| Understanding The Signatures Of Emergent Magnetism In Topological Insulator/Ferrite Bilayers | Y. SUZUKI STANFORD |
| Kane-Mele-Hubbard Physics In Semiconductor Moiré Materials | K. F. MAK CORNELL |
| Exploring Quantum Spin Liquids with Near-Field Terahertz Magnetic Spectroscopy | J. HARTER UCSB |
| Exploring Correlated Topological States with Charge Density Waves | K. BURCH & L. SCHOOP BC & PRINCETON |