

WINDS

INNOVATIVE NANOSCALE DEVICES AND SYSTEMS

*OUTRIGGER KONA RESORT AND SPA, KAILUA-
KONA, HI (ISLAND OF HAWAII - "BIG ISLAND")*

DECEMBER 3 – 8, 2023

PROGRAM



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Topical
Conference**
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Applied Physics Letters

Program

- General sessions are in Kaleiopapa Convention Center (KCC) Keauhou Rooms One and Two
- Registration will be open each day in the Kaleiopapa Convention Center Foyer starting on Sunday from 15:00-1800, Monday starting 60 minutes before the AM1 session, and remaining days starting 30 minutes before the AM1 session.

Sunday, December 3

15:00-18:00	Registration Kaleiopapa Convention Center Foyer
18:00-20:00	Gala Reception Pa'akai Point (Rays on the Bay if rain)

Monday, December 4

08:45-09:00	Opening remarks (Keauhou Two) John Conley (Oregon State University, General Chair) and Stephen Goodnick (Arizona State University, Local Arrangements)
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MAM1: Keynote Session - Advanced devices (Keauhou Two) Session chair: John Conley (Oregon State University, USA)	
09:00-09:30 (Keynote)	Eric Lin (NIST, USA) <i>CHIPS Act</i>
09:30-10:00 (Invited)	Michael Fuhrer (Monash University, Australia) <i>Two-Dimensional Topological Materials for Low-Voltage Transistors</i>
10:00-10:30 (Invited)	Xiangfeng Duan (UCLA, USA) <i>Towards Designable Artificial Quantum Solid with High-Order van der Waals Superlattices</i>
10:30-11:00	Coffee break

MAM2: 2D Materials I - Light-Matter Interactions and van der Waals structures (Keauhou Two)	
Session chair: Berry Jonker (Naval Research lab)	
11:00-11:30 (Invited)	Dmitri Basov (Columbia University, USA) <i>Polaritons at van der Waals interfaces</i>
11:30-11:45	Jeffrey Schwartz (University of Maryland, USA) <i>Mid-Infrared, Near-Infrared, and Visible Nanospectroscopy of Hydrogen-Intercalated MoO₃</i>
11:45-12:00	Slava V. Rotkin (Pennsylvania State University, USA) <i>Optical imaging of low-dimensional materials beyond diffraction limit</i>
12:00-12:30 (Invited)	Tomoki Machida (University of Tokyo, Japan) <i>Subband electronics and symmetry engineering using van der Waals assembly of transition metal dichalcogenides</i>
12:30-12:45	Momoko Onodera (University of Tokyo, Japan) <i>All-dry flip-over stacking of 2D crystal flakes using polyvinyl chloride</i>
12:45-13:00	Ramesh Kudalippallylil (University of Maryland, USA) <i>Probing Slow and Fast Transient Responses in Ultrafast-Excited Multilayer MoS₂ Flakes on a Microdisk Resonator</i>
13:00-19:00	Ad hoc session

MPM: Ferroelectrics & oxides (Keauhou Two)	
Session Chairs: John Conley (Oregon State University, USA) & David Henry (Sandia National Labs, USA)	
19:00-19:30 (Invited)	Jon Ihlefeld (University of Virginia, USA) <i>Phase Stabilizing Mechanisms to Achieve High-Performing Ferroelectric Hafnium Zirconium Oxide for Memory Applications</i>
19:30-19:45	M. David Henry (Sandia National Laboratory, USA) <i>Multilevel Resistance for Ta/Hf_{0.6}Zr_{0.4}O₂/TaN Ferroelectric Tunnel Junction Devices</i>
19:45-20:00	John F. Conley (Oregon State University, USA) <i>Internal Photoemission (IPE) Spectroscopy Measurement of Conduction Band Offsets in Pristine and Poled Ferroelectric ALD HfZrOx Metal/Ferroelectric/Semiconductor (MFS) Devices</i>
20:00-20:15	Zirun Han (University of Pennsylvania, USA) <i>Multistate 20, 10, and 5 nm Al_{1-x}Sc_xN Ferroelectric Diodes</i>
20:15-20:30	Detlev Gruetzmacher (Forschungszentrum Jülich, Germany) <i>Ferroelectric Polarization Modulated Schottky Diodes Enabling Improved Neuromorphic Functionality</i>
20:30-20:45	Bryan M. Wong (University of California-Riverside, USA) <i>Harnessing Laser-Driven Excitations to Control Polarization Switching in Ferroelectric Materials</i>
21:00	Adjourn

Tuesday, December 5

TAM1: Topology & Chirality I (Keauhou One)	
Session Chairs: Jaroslav Fabian and Stuart Parkin	
09:00-09:30 (Invited)	Ron Naaman (Weizmann Institute, Rehovot, Israel) <i>The Electron's Spin and Chirality- a Miraculous Match</i>
09:30-09:45	Matthew Gilbert (University of Illinois, USA) <i>Magnetostrictive Evolution of Singular Anisotropic Magnetoresistance in Topological Metals</i>
09:45-10:00	Denis Kochan (Slovak Academy of Sciences, Bratislava, Slovakia) <i>Dirac-type charge carrier dynamics and Landau levels on curved surfaces</i>
10:30-11:00	Coffee break

TAM2: 2D Materials II - Advanced Device Applications (Keauhou Two)	
Session Chairs: Tomoki Machida and Berry Jonker	
09:00-09:15	Teja Potocnik (University of Cambridge, UK) <i>High throughput characterization and automated fabrication of lateral TMD heterostructure devices</i>
09:15-09:30	Kazuhiko Matsumoto (Osaka University, Japan) <i>Enhancement of Sensitivity for Influenza Virus Detection by Integrated Graphene FET Biosensor using Surface Potential Modulator</i>
09:30-09:45	Sanjaya Lohani (University of Illinois Chicago, USA) <i>Control variational quantum algorithm meets artificial intelligence</i>
09:45-10:00	Arisa Chiba (Institute for Materials Research, Japan) <i>Analysis of Wear Morphology of Concentrated Polymer Brushes under Various Conditions Using Coarse-Grained Molecular Dynamics</i>
10:00-10:15	Alexander Balandin (UCLA, USA) <i>Charge-Density-Wave Domain Depinning in Quasi-Two-Dimensional van der Waals Materials – Novel Functionality for Electronic Applications</i>
10:30-11:00	Coffee break

TAM3: Light-Matter (Keauhou One)	
Session Chairs: Kazuhiko Matsumoto and Igor Zutic	
11:00-11:15	Fei Yao (University at Buffalo, USA) <i>Two-dimensional van der Waals Materials and Their Mixed Low-Dimensional Hybrids for Clean Energy Applications</i>
11:15-11:30	Mahmoud Jalali Mehrabad (University of Maryland, USA) <i>Chiral optical nanocavity with atomically thin mirrors</i>
11:30-11:45	Kouichi Semba (National Institute of Information and Communications Technology, Japan) <i>Can the qubit frequency remain finite even under the very strong Lamb shift from an infinite number of electromagnetic modes?</i>
11:45-12:00	Hirofumi Shiraki (Osaka Research Institute of Industrial Science and Technology, Japan) <i>Superfluorescence-induced optical force in structural environment</i>
12:00-12:15	Shuva Mitra (University of Wisconsin, USA) <i>Enhanced optical nonlinearity in graphene nanomeshes</i>
12:15-12:45 (Invited)	Taishi Nishihara (Kyoto University, Japan) <i>Distinctive high-temperature light emission originating from one-dimensional excitons of carbon nanotubes</i>
12:45-13:00	Zizwe Chase (University of Illinois at Chicago, USA) <i>Strong Coupling of Cd3As2 Ribbons and Photons in a Terahertz Photonic Crystal Cavity</i>
13:00-19:00	Ad hoc session

TAM4: 2D Materials III - Quantum Science (Keauhou Two)	
Session Chair: Alexander Balandin (UCLA)	
11:00-11:30 (Invited)	Lee Bassett (University of Pennsylvania, USA) <i>Optically addressable single spins in hexagonal boron nitride</i>
11:30-12:00 (Invited)	Andreas Stier (Technische Universität München, Germany) <i>Optically probing many-body quantum phases in atomically thin 2D-heterostructures</i>
12:00-12:15	Berry Jonker (Naval Research Laboratory, USA) <i>Single Photon Emitters in 2D Materials</i>
12:15-12:30	Herbert F. Fotso (University at Buffalo SUNY, USA) <i>Enabling Efficient Photon-Mediated Operations Between Spectrally Different Quantum Bits</i>
12:30-12:45	Tong Zhou (SUNY Buffalo, USA) <i>Fusion and Braiding of Majorana Zero Modes in Topological Planar Josephson Junctions</i>
12:45-13:00	Leonid Rokhinson (Purdue University, USA) <i>A platform for braiding Majorana modes with magnetic skyrmions</i>
13:00-19:00	Ad hoc session

TPM: Light-matter, Solar, Superconductivity (Keauhou Two)	
Session chairs: Victor Klimov and Stuart Parkin	
19:00-19:30 (Invited)	Bin Hu (University of Tennessee, USA) <i>Dynamic Interactions between Spin Order and Orbital Order in 2D-Superlattice Perovskite Film</i>
19:30-19:45	Victor I. Klimov (Los Alamos National Laboratory, USA) <i>Colloidal Quantum Dot Laser Diodes: Three Decades in the Making</i>
19:45-20:00	Stuart Parkin (Max Planck Institute of Microstructure Physics, Germany) <i>The Josephson Diode effect</i>
20:00-20:15	Gunuk Wang (Korea University, Korea) <i>Robust and skin-attachable memristor synaptic array for pattern and real-time finger motion recognition</i>
20:15-20:30	Sangita Regmi (University of Illinois Chicago, USA) <i>Data-informed prior for Bayesian state tomography</i>
20:30-20:45	Gerhard Klimeck (Purdue University, USA) <i>Bridging Communities in Chipshub on nanoHUB.org - From Advanced Materials and Devices to Full Chip Design</i>
21:00	Adjourn

Wednesday, December 6

WAM1: 2D Materials IV – Transport Properties (Keauhou Two)	
Session Chair: Berry Jonker (NRL)	
09:00-09:30 (Invited)	Daniel Rhodes (University of Wisconsin, USA) <i>Topologically Nontrivial States, Superconductivity, and Ferroelectricity in Few-layer 2M and Td-TMDs</i>
09:30-10:00 (Invited)	Elisabetta Paladino (University of Catania, Italy) <i>Noise mechanisms in short ballistic graphene Josephson junctions</i>
10:00-10:15	Huamin Li (University at Buffalo, USA) <i>Tunable Charge Transport at 2D/3D Integrated Interfaces</i>
10:15-10:30	Hui Zhao (University of Kansas, USA) <i>Generating free charge carriers in graphene in a van der Waals multilayer heterostructure</i>
10:30-11:00	Coffee break

WAM2: Modeling, Simulations, and Computations (Keauhou One)	
Session Chairs: Ian Sellers and Takahashi Ishikawa	
09:00-09:15	Ryoya Kano (Tohoku University, Japan) <i>Investigation of PtCo Alloy Catalyst Composition for Suppression of H₂O₂ Formation in Polymer Electrolyte Fuel Cell Anodes by First-Principles Calculations</i>
09:15-09:30	Shogo Fukushima (Tohoku University, Japan) <i>Molecular Dynamics Simulation on Stress Corrosion Cracking of High Entropy Alloys in Water Environment</i>
09:30-09:45	Jonah Shoemaker (Arizona State University, USA) <i>Influence of Deformation Potential Scattering on Impact Ionization and Critical Field in Ultra-Wide Bandgap Materials</i>
09:45-10:00	Xujiao Gao (Sandia National Laboratories, USA) <i>TCAD-Optimization Informed Modeling of Commercial SiC MOSFET</i>
10:00-10:15	Takashi Ishikawa (Tohoku University, Japan) <i>Reactive Molecular Dynamics Simulation for Revealing Splitting Phenomena and Mechanism of Ni Particles in Solid Oxide Fuel Cell Anode</i>
10:15-10:30	Ryutaro Kudo (Tohoku University, Japan) <i>Effect of Ethylene Glycol Additives on the Water Lubrication of Silicon Nitride - Molecular Dynamics Simulation with Neural Network Potential -</i>
10:30-11:00	Coffee break

WAM3: Spintronics & Quantum (Keauhou One)	
Session Chair: Wolfgang Porod and Akira Oiwa	
11:00-11:15	Akira Oiwa (Osaka University, Japan) <i>Shortcut to adiabaticity for adiabatic passage of a single electron spin</i>
11:15-11:30	Josef Weinbub (TU Wien, Austria) <i>Controlling Single Electrons by Non-Uniform Magnetic Fields</i>
11:30-11:45	Samuel Belling University of Wisconsin, USA <i>Scattering in the Wigner Equation</i>
11:45-12:00	Juan Mendez (Sandia National Laboratories, USA) <i>Atomic Precision Advanced Manufacturing (APAM) devices for quantum sensing</i>
12:00-12:15	Alexander Khitun (University of California – Riverside, USA) <i>Magnonic Combinatorial Memory</i>
12:15-12:30	Deepak K. Singh (University of Missouri, USA) <i>Magnetic charge quasi-particle dynamics for spintronics and reservoir computing applications</i>
12:30-12:45	Wolfgang Porod (University of Notre Dame, USA) <i>Interference-based computing using nonlinear spin waves</i>
13:00-18:30	Ad hoc session

WAM4: Topology & Chirality (Keauhou Two)	
Session Chair: Matt Gilbert	
11:00-11:30 (Invited)	Dieter Weiss (University of Regensburg, Germany) <i>Quantum transport in HgTe topological insulators and HgTe-superconductor hybrids</i>
11:30-11:45	Saurav Islam (Pennsylvania State University, USA) <i>Topological Hall effect in Dirac semimetal</i>
11:45-12:15 (Invited)	Kirstin Alberi (NREL, USA) <i>Epitaxial Topological Semimetal Thin Film Platforms for Device Applications</i>
12:15-12:45 (Invited)	Takis Kontos (ESN, Paris, France) <i>Quantum sensing of axion dark matter with a phase resolved haloscope</i>
13:00-18:30	Ad hoc session

18:30-21:00	Banquet at Bayview Grounds (Rays on the Bay if rain)
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Thursday, December 7

RAM1: 2D Materials V - Strain & Thermal Properties (Keauhou Two)	
Session chair: Igor Zutic (SUNY Buffalo, USA)	
09:00-09:30 (Invited)	Clivia M. Sotomayor Torres (Catalan Institute of Nanoscience and Nanotechnology, Spain) <i>Phonons in free-standing nanostructured membranes of MoSe and Si</i>
09:30-09:45	Davoud Adinehloo (University at Buffalo, USA) <i>Emergent Wetting Behavior and Strain Engineering in 2D Materials on Nanostructured Substrates</i>
09:45-10:00	Laleh Avazpour (University of Wisconsin, USA) <i>Modeling Long-Wavelength Phonon Dynamics for Enhanced Thermal Transport in Nanomaterials</i>
10:00-10:15	Fereshte Ghahari (George Mason University, USA) <i>Thermal probe of Fractional quantum Hall states in Bilayer graphene</i>
10:30-11:00	Coffee break

RAM2: 2D Materials VI - Magnetic & Spin-dependent Properties (Keauhou Two)	
Session Chair: Victor I. Klimov and Clivia Sotomayor Torres	
11:00-11:30 (Invited)	Scott Crooker (Los Alamos National Lab, USA) <i>Asymmetric proximity interactions and chiral quantum light generation in 2D magnet/semiconductor van der Waals heterostructures</i>
11:30-11:45	Igor Zutic (University of Buffalo) <i>Terahertz Spin-Light Coupling in Proximitized Dirac Materials</i>
11:45-12:00	Christopher L. Hinkle (University of Notre Dame, USA) <i>Magnetically Doped Transition Metal Dichalcogenides</i>
12:00-12:15	Fariborz Kargar (UCLA, USA) <i>Electron Transport in Vertical Quasi-Two-Dimensional Antiferromagnetic Semiconductor Devices</i>
12:15-12:30	Jaroslav Fabian (University of Regensburg, Germany) <i>Correlated phases in proximitized (untwisted) graphene multilayers</i>
12:30-12:45	Gerhard Klimeck (Purdue University, USA) <i>Materials screening for spin orbit torque in two-dimensional van der Waals heterostructures</i>
12:45-13:00	Maciej Kalka (AGH University of Science and Technology, Poland) <i>Phase-space approach for the topological phase transitions in silicene</i>
13:15-19:00	Ad hoc session

RPM Rapid Poster Talks (Keauhou One)	
Session Chair: Alex Balandin and Jaroslav Fabian	
19:00-19:10	Alexander Balandin (UCLA, USA) <i>Publishing in APL</i>
19:10-19:15	<i>Intro to poster talks</i>
19:15-19:20	Bonhwi Gu (Sungkyunkwan University, Korea) <i>Novel probe metal pads design for IC test in DRAM</i>
19:20-19:25	Hyojin Park (Sungkyunkwan University, Korea) <i>The mask stack efficiency for improving gate oxide reliability of DRAM</i>
19:25-19:30	Izabella Wojciechowska (AGH University of Science and Technology, Poland) <i>Charge-to-spin conversion in twisted graphene on transition metal dichalcogenides</i>
19:30-19:35	Piotr Pigon (AGH University of Science and Technology, Poland) <i>Electronic and Topological Properties of a Topological Insulator Thin Film Sandwiched between Ferromagnetic Insulators</i>
19:35-19:40	Wei Pan (Sandia National Laboratories, Livermore, USA) <i>Novel Josephson effects in Dirac semimetals</i>
19:40-19:45	Shahabaj Mundaganur (University at Buffalo, USA) <i>Asymmetrically Engineered Nanoscale Transistors for On-Demand Sourcing of Terahertz Plasmons</i>
19:45-19:50	Sunghwan Cho (Sungkyunkwan University, Korea) <i>Circuit-level device modeling for framework analyzing hot carrier injection failure in gate-all-around (GAA) charge trapping flash (CTF) memory devices based on new experimental methodology</i>
19:50-19:55	Kota Jojima (Tohoku University, Japan) <i>Coarse-grained molecular dynamics simulation study on the dispersion mechanism of organically modified nanoparticles in mixed solvent - Analysis of nanoparticle/solvent/nanoparticle interface structure</i>
19:55-20:00	Anton Burtsev (Kotelnikov Institute of Radioengineering and Electronics of RAS, Russia) <i>Forming of Elliptical Electron Beam Based on Field Emitter with CNTs</i>
20:00-20:05	Yasushi Shoji (National Institute of Advanced Industrial Science and Technology, Japan) <i>2.1 eV AlGaInP photovoltaic device for use in radiation environment</i>
20:05-21:00	<i>Poster discussion and drinks</i>
21:00	Adjourn

Friday, December 8

FAM1: 2D Topology & Chirality (Keauhou Two)	
Session Chair: Matthew Gilbert and Valeria Lauter	
09:00-09:30 (Invited)	Claudia Felser (Max-Planck Institute Dresden, Germany) <i>Chirality and Topology</i>
09:30-09:45	Masashi Kawasaki (University of Tokyo, Japan) Proximity effect of an emergent field from spin ice in an oxide heterostructure
09:45-10:00	Luis Jauregui (University of California - Irvine, USA) <i>Dominant Surface State Transport in HfTe5 thin films</i>
10:00-10:15	Valeria Lauter (Oak Ridge National Laboratory, USA) <i>Quasi-two-Dimensional Chromium Telluride: Thickness Dependent magnetism and Strain-tunable Berry curvature</i>
10:15-10:30	Wenyao Liu (Boston College, USA) <i>Evidence of 1D propagating topological superconducting mode along edge of Fe(Te,Se)</i>
10:30-11:00	Coffee break

FAM2: Advanced Devices & Neuromorphic (Keauhou Two)	
Session Chair: Steve Goodnick and Marius Orlowski	
11:00-11:15	Denis Mamaluy (Sandia National Laboratory, USA) <i>Si:P δ-layer Resonant Tunnel Junctions for TeraHertz applications</i>
11:15-11:30	Viktor Sverdlov (TU Wien, Austria) <i>Multi-bit Operation in an MRAM Cell with a Composite Free Layer</i>
11:30-11:45	Marius Orlowski (Virginia Tech, USA) <i>Electron Tunneling between Vibrating Cu Atoms in a Cu Filament in a Neuromorphic ReRAM Device</i>
11:45-12:00	Saulius Marcinkevicius (KTH Royal Institute of Technology, Sweden) <i>Experimental evidence of a novel mechanism of hole injection into quantum wells of long wavelength GaN-based LEDs</i>
12:00-12:15	Dong Sik Park (Sungkyunkwan University, Korea) <i>New Method for Improving AI Void and Refresh Characteristics in sub 25nm DRAM</i>
12:15-12:30	Minhyung Kim (Sungkyunkwan University, Korea) <i>A novel technology for edge patterning in processes using SOH masks in sub-20nm DRAM</i>
12:30	Closing Remarks / Conference Ends