SYMPOSIUM
MQ01

Coherent and Correlated Magnetic Materials for Hybrid Quantum Interfaces
December 2 - December 6, 2019

Symposium Organizers
Andrew Fisher, Imperial College London
Shunsuki Fukami, Tohoku University
Evelyn Hu, Harvard University
Ezekiel Johnston-Halperin, The Ohio State University

* Invited Paper

SESSION MQ01.01: Single Spins and Single Photons
Session Chairs: Ezekiel Johnston-Halperin and Patrick Maletinsky
Monday Afternoon, December 2, 2019
Hynes, Level 2, Room 202

1:30 PM MQ01.01.01
Electronic, Spin and Structural Properties of Er3+ Doped Yttria: Y2O3
Cuneyt Sahin1,2, Tian Zhong2 and Michael E. Flatté1,2,3; 1University of Iowa, United States; 2The University of Chicago, United States; 3Eindhoven University of Technology, Netherlands

1:45 PM MQ01.01.02
Nanoscale Structure of the Orbital Magnetic Moment of a Single Dopant Spin in a Semiconductor
Adonai R. Cruz1 and Michael E. Flatté2,1; 1Eindhoven University of Technology, Netherlands; 2University of Iowa, United States

2:00 PM *MQ01.01.03
Electrical Manipulation of Isolated Quantum Spins Using Classical SIC
Christopher P. Anderson1, Alexandre Bourassa1, K.C. Miao1 and David D. Awschalom1; 1The University of Chicago, United States; 2Argonne National Laboratory, United States

2:30 PM MQ01.01.04
Spin-Photon Interfaces Based on Tin-Vacancy Quantum Emitters in Diamond
Matthew Trusheim, Lorenzo De Santis, Kevin C. Chen and Dirk Englund; Massachusetts Institute of Technology, United States

2:45 PM MQ01.01.05
Quantum Emitters with Tailored Optical and Spin Physics
Christopher J. Ciccarino1, Johannes Flick1, Isaac Harris1,2, Dirk R. Englund2 and Prineha Narang1; 1Harvard University, United States; 2Massachusetts Institute of Technology, United States

3:00 PM MQ01.01.06
Vanadium Spin Qubits as Telecom Quantum Emitters in Silicon Carbide
Gary Wollowicz1,2; Christopher P. Anderson2, Berk Diler3, Oleg G. Poluektov2, Joseph F. Heremans2,1 and David D. Awschalom1,2; 1The University of Chicago, United States; 2Argonne National Laboratory, United States

3:15 PM BREAK

SESSION MQ01.02: Single Spinns and Electron Transport
Session Chairs: Christian Degen and Ezekiel Johnston-Halperin
Monday Afternoon, December 2, 2019
Hynes, Level 2, Room 202

3:30 PM MQ01.02.01
Spin Filtering through Chiral Molecule Monolayers on Semiconductors
Tianhan Liu1, Longqian Hu1, Eric Lochner1, Peng Xiong1, Xiaolei Wang1, Haifong Wang2, Jianhua Zhao2, Gang Shi1, Fan Gao3, Honglei Feng2 and Yongqing Li1; 1Florida State University, United States; 2Institute of Semiconductors, China; 3Institute of Physics, China

3:45 PM MQ01.02.02
Imaging Spin Dependent Properties of Individual Dopants through DC Magnetoresistance of Spin-Polarized Scanning Tunneling Microscopy Current
Stephen R. McMillan1,2, Nicholas J. Harmon1 and Michael E. Flatté; University of Iowa, United States; 2The University of Chicago, United States; 3University of Evansville, United States; 4Eindhoven University of Technology, Netherlands

4:00 PM *MQ01.02.03
Quantum Coherent Single-Spin Dynamical Effects in DC Electrical Transport
Michael E. Flatté; University of Iowa, United States

4:30 PM MQ01.02.04
Electrically Detected Electron Nuclear Double Resonance in a Transistor
Brian R. Manning1, Ryan J. Waskiewicz1, Duane J. McCrory2 and Patrick M. Lenahan1; 1The Pennsylvania State University, United States; 2Keysight Technologies, United States

4:45 PM MQ01.02.05
Charge State Control of Single Spins in Semiconductor
Christopher P. Anderson, Alexandre Bourassa and David D. Awschalom; University of Chicago, United States

SESSION MQ01.03/EL05.07: Joint Session: Quantum Effects
Session Chairs: James Haigh and Patrick Maletinsky
Tuesday Afternoon, December 3, 2019
Hynes, Level 1, Room 107

1:30 PM *MQ01.03.01/EL05.07.01
The Tin Vacancy Center in Diamond—An Interesting New Qubit Candidate?
Christoph Becher; Saarland University, Germany

2:00 PM MQ01.03.02/EL05.07.02
Development of Scalable Technology for NV-Magnetometry and Photonics on Single Crystalline Diamond
Christian Giese1, Patricia Quellmalz1, Helge Gehring2, Wolfram Pernice2 and Christoph E. Nebel1; 1Fraunhofer IAF, Germany; 2University Muenster, Germany

2:15 PM MQ01.03.03/EL05.07.03
Rapid, High-Resolution Magnetic Microscopy of Single Magnetic Microbeads
Julia M. McCoey, Robert W. de Gille, Babak Nasr, Jean-Philippe Tetienne, Liam T. Hall, David A. Simpson and Lloyd Hollenberg; University of Melbourne, Australia

2:30 PM *MQ01.03.04/EL05.07.04
Quantum Sensing of Atomically Thin Magnets
Patrick Maletinsky; Basel University, Switzerland

3:00 PM BREAK

3:30 PM *MQ01.03.05/EL05.07.05
Imaging the Domain Pattern of In-Plane Layered Antiferromagnets using Diamond Magnetometry
Martin S. Wornle, Pol Welter and Christian Degen; ETH Zurich, Switzerland
4:00 PM MQ01.03/06/EL05.07.06
Metrology Driven Development of Point Defect Synthesis and Localization Nazar Delegan1, Samuel J. Whiteley2,3, Edward Bielejec1, David D. Awschalom2,3 and Joseph F. Heremans2,3,1; 1Argonne National Laboratory, United States; 2The University of Chicago, United States; 3Sandia National Laboratories, United States

4:15 PM MQ01.03/07/EL05.07.07
First Principles Discovery and Understanding of Color Centers in Diamond for Quantum Information Science Isaac Harris1,2,3, Christopher J. Ciccantino1, Johannes Fick1, Dirk R. Englund1 and Prineha Narang1,2; 1Massachusetts Institute of Technology, United States; 2Harvard University, United States

4:30 PM *MQ01.03.08/EL05.07.08
Understanding and Mitigating Quantum Decoherence of Nitrogen-Vacancy Center Spins for High-Spatial Resolution Quantum Sensing Ania Bleszynski Jayich1 and Delev Brebion1,2; 1University of California, Santa Barbara, United States; 2Harvard University, United States

SESSION MQ01.04: Magnon Condensation and Transduction
Session Chair: Andrew Fisher
Wednesday Morning, December 4, 2019
Hynes, Level 2, Room 202

8:15 AM MQ01.04.01
Ultrastrong Magnon-Magnon Coupling in YFeO3 in Magnetic Fields up to 30 T Takuma Makihara1, Gary T. Noel1, Xinwei Li1, Kenji Hayashida1, Nicolas Marquez1, Xiaoqian Ma1, Zuanming Jin2, Wei Ren1, Guohong Ma1, Shixin Cao2, Motoaaki Bamba3,4 and Junichiro Kono1,2,3; 1Rice University, United States; 2University of Tokyo, Japan; 3RIKEN, Japan; 4University College London, United Kingdom

9:00 AM MQ01.04.03
Phono-Magnetic Analog to Opto-Magnetic Effects Dominik M. Jurasek1,2, Sebastian Stepanow1, Prineha Narang1 and Nicola Spaldin1,2; 1Harvard University, United States; 2ETH Zürich, Switzerland

9:15 AM *MQ01.04.04
Solid-State Room-Temperature Masers—A Platform for Macroscopic Dicke States Jonathan Breeze1,2, Enrico Salvadori2, Juna Sathiraj1, Neil Alford3 and Christopher W. Køy3,4; 1Imperial College London, United Kingdom; 2University of Turin, Italy; 3University of Saarland, Germany; 4University College London, United Kingdom

9:45 AM BREAK

SESSION MQ01.05: Quantum and Highly Coherent Magnonics
Session Chairs: Jonathan Breeze and Andrew Fisher
Wednesday Morning, December 4, 2019
Hynes, Level 2, Room 202

10:15 AM MQ01.05.01
An Anomalous Large Spin Seebeck Effect in the Low-Loss (High-Q) Ferrimagnet Vanadium Tetracyanoethylene (V[TCNE])_2 Seth Kurfman1, Yuanhua Zheng1, Andrew Franson1, Brandi Wooten1, Michael Chickle1, Kristen Buchanan1, Joseph P. Heremans1,3 and Ezekiel Johnston-Halperin1; 1The Ohio State University, United States; 2Colorado State University, United States

10:30 AM MQ01.05.02
Quantum-Enhanced Sensing in Magnonics with a Superconducting Qubit Dany Lauchlan-Quirion1, Samuel P. Wolski1, Yutaka Tabuchi1, Shingo Kono2, Koji Usami3 and Yasunobu Nakamura1,2; 1The University of Tokyo, Japan; 2RIKEN, Japan

11:00 AM MQ01.05.03
Fringe Fields and Spin Waves in V[TCNE]_2 Cylindrical Disks Denis Candido1,2 and Michael E. Flatté1,2,3; 1University of Iowa, United States; 2University of Chicago, United States; 3Eindhoven University of Technology, Netherlands

11:15 AM MQ01.05.04
Dispersion Relations and Linewidths of 1D and 2D Magnonic Crystals of V[TCNE]_2 Kwanval Hu1,2,3 and Michael E. Flatté1,2,3; 1University of Iowa, United States; 2University of Chicago, United States; 3Eindhoven University of Technology, Netherlands

11:30 AM MQ01.05.05
Photodriven Quantum Teleportation of an Electron Spin State in a Covalent Donor-Acceptor-Radical System Michael R. Wasielewski, Brandon Rugg, Matthew D. Kreyzinga, Brian T. Phelan, Mark Ratner and Ryan Young; Northwestern University, United States

11:45 AM MQ01.05.06
Low Damping Ferromagnetic Resonance in Electron-Beam Patterned, High-Q Vanadium Tetracyanoethylene Magnon Cavities Andrew J. Franson1, Na Zhu1, Seth Kurfman1, Michael Chickle1, Denis Candido1, Kristen Buchanan1, Michael E. Flatté1, Hong Tang2 and Ezekiel Johnston-Halperin1; 1The Ohio State University, United States; 2Yale University, United States; 3The University of Iowa, United States; 4Colorado State University, United States

SESSION MQ01.06/MQ02.06/MQ03.06: Panel Discussion: Quantum Materials
Session Chairs: Jeffrey McCallum and Christopher Richardson
Wednesday Afternoon, December 4, 2019
Hynes, Level 2, Room 202

3:30 PM PANEL DISCUSSION: QUANTUM MATERIALS

SESSION MQ01.07: Magnetic Materials
Session Chair: Evelyn Hu
Thursday Afternoon, December 5, 2019
Hynes, Level 2, Room 202

1:30 PM *MQ01.07.01
Noncollinear Magnetism in Complex Oxide Superlattices Jennifer E. Hoffman and Jason D. Hoffman; Harvard University, United States

2:00 PM MQ01.07.02
Electric Field Control of the Magnetic and Associated Metal-Insulator Transitions in Iridates Juan Ignacio Beltrán1,2, Andrea Peralta1, Javier Tornos2, Fernando Gallego1, Carlos León2, Jacobo Santamaría2 and Carmen Muñoz2; 1Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Científicas, ICMM (CSIC), Spain; 2Universidad Complutense de Madrid, Spain

2:15 PM MQ01.07.03
Mechanistic Insights into the Superexchange-Interaction-Driven Negative Thermal Expansion in CuO Yuanpeng Zhang1,2, Marshall McDonnell3, Stuart Calder1 and Matt Tucker1; 3National Institute of Standards and Technology, United States; 2Oak Ridge National Laboratory, United States
2:30 PM *MQ01.07.04
Growth and Properties of Magnetic Heusler Epitaxial Thin Films Chris J. Palmstrom; University of California, Santa Barbara, United States

3:00 PM BREAK

SESSION MQ01.08: Spin, Orbit and Topology
Session Chairs: Evelyn Hu and Ezekiel Johnston-Halperin
Thursday Afternoon, December 5, 2019
Hynes, Level 2, Room 202

3:30 PM *MQ01.08.01
Spin-Orbit Torque Switching of Antiferromagnet and Ferrimagnet Feng Pan, Cheng Song, Xianzhe Chen and Xiaofeng Zhou; Tsinghua University, China

4:00 PM MQ01.08.02
Spin-Orbit Torques in Mn$_2$Au/Permalloy Bilayers Cheng Song$^1$, Xiaolong Fan$^2$, Wenwen Kong$^1$, Xiaofeng Zhou$^1$ and Feng Pan$^1$; $^1$Tsinghua University, China; $^2$Lanzhou University, China

4:15 PM MQ01.08.03
Microscopic Dynamics and Optoelectronic Response of Type-I Weyl Semimetals from First Principles Christina Garcia, Jennifer Coulter and Prineha Narang; Harvard University, United States

4:30 PM *MQ01.08.04
Topological Materials for Quantum Devices and Beyond Claudia Felser, Johannes Goorth and Konstantin Manna; Max Planck Institute, Germany

SESSION MQ01.09: Spin, Orbit and Optics
Session Chairs: Hidetaka Kurebayashi and Feng Pan
Friday Afternoon, December 6, 2019
Hynes, Level 2, Room 202

1:30 PM *MQ01.09.01
Tuning Optical and Spin-Valley Properties in van der Waals Heterostructures Bernhard Urbaszek$^1$, Mikhail Glazov$^2$, Marina Semina$^3$, Xavier Mairie$^4$, Cedric Robert$^5$, Scott Crooker$^6$, Mateusz Goryca$^7$, Shivangi Shree$^8$, Bo Han$^2$ and Honghua Fang$^1$; $^1$Institut National des Sciences Appliquées de Toulouse, France; $^2$Rutgers University, US; $^3$University of Genoa, Italy; $^4$University of California, Santa Clara, US; $^5$Helmholtz-Zentrum Geesthacht, Germany; $^6$Imperial College London, UK; $^7$Imperial College London, UK; $^8$Los Alamos National Laboratory, US

2:00 PM *MQ01.09.02
Optical Measurements of Electron and Nuclear Spin Polarization in Semiconductors Vanessa Sih; University of Michigan, United States

2:30 PM MQ01.09.03
Exciton-Polaritons as a Tool to Control the Emission Characteristics of Exciton and Triions Bound to Te$_2$ in ZnSe Anne-Laurence Phaneuf-L’Heureux, Mathias Pont and Sebastien Francouez; Polytechnique, Genie physique, Canada

2:45 PM MQ01.09.04
Resonant Excitation of Excitons and Triions Bound to Te$_2$ Molecules in ZnSe Mathias Pont, Anne-Laurence Phaneuf-L’Heureux and Sebastien Francouez; Polytechnique, Genie physique, Canada

3:00 PM *MQ01.09.05
Gate-Controllable Spin Splitting and Giant Proximity Magnetoresistance in InAs Induced by a Magnetic Proximity Effect Anh Le Duc$^1$, Kosuke Takiguchi$^2$, Takahiro Chiba$^2$, Tomohiro Koyama$^3$, Daichi Chiba$^4$ and Masaaki Tanaka$^4$; $^1$The University of Tokyo, Japan; $^2$National Institute of Technology, Fukushima College, Japan; $^3$Osaka University, Japan