



2023 NRIC Conference Program

Conference on Topology and Valley Driven Quantum Phenomena

Friday March 17, 2023 Embassy Suite, Lincoln, NE

7:30 AM Conference materials pick up and continental breakfast

8:00 AM Welcome and opening remarks, Matt Andrews

Invited Session 1 Magnetism in 2D van der Waals Heterostructures

Chair: Xia Hong

8:15 AM **Xiaodong Xu**, University of Washington

Interaction induced magnetism in 2D semiconductor moire superlattices

9:00 AM **Branislav Nikolic**, University of Delaware

Spin-Orbit Torque and Spin Pumping in van der Waals Heterostructures of Magnetic Two-Dimensional Materials

Morning Poster Session (9:45-11:00 AM)

Invited Session 2 Topological Semimetals

Chair: Xiaoshan Xu

11:00 AM **Liuyang Zhao**, University of Michigan

Dual magnetism and magnetic fluctuations in a magnetic Weyl semimetal $Co_3Sn_2S_2$

11:45 AM **Mingzhong Wu**, Colorado State University

Harnessing Spin in α -Sn

12:30 PM **Lunch**

Invited Session 3 Chiral Phonon Phenomena

Chair: Alexey Kovalev

1:30 PM **Di Xiao**, University of Washington
Phonon Magnetic Moment

Afternoon Poster Session (2:15-3:30 PM)

Invited Session 4 Novel Topological Materials

Chair: Yinsheng Guo

3:30 PM **Seongshik (Sean) Oh**, Rutgers, the State University of New Jersey
Hybrid topological superconductors: Toward an optimal platform for topological quantum computation

4:15 PM **Shuyang Xu**, Harvard University
Observation of the Layer Hall Effect in Topological Axion Antiferromagnet $MnBi_2Te_4$

5:00 PM Conference ends

Poster Index

(Odd numbered: morning session. Even numbered: afternoon session.)

Emergent Ferroic Materials and Phenomena	
1	Studying the creation and motion of skyrmions in broken inversion symmetry CoPt gradient single-crystal thin films <u>Adam Erickson</u> , Qihan Zhang, Suvechhya Lamichhane, Sy-Hwang Liou, Jingshen Chen, Abdelghani Laraoui
2	Nonreciprocal topological edge states unveiled by all-dielectric metasurface platform <u>Sema Guvenc Kilic</u> , Ufuk Kilic, Mathias Schubert, Eva Schubert, Christos Argyropoulos
3	Magnetic antiskyrmions in 2D van der Waals magnets engineered by layer stacking <u>Kai Huang</u> , Ding-Fu Shao, Edward Schwartz, Alexey Kovalev, and Evgeny Y. Tsymbal
4	Anomalous Hall effect in Platinum/Nickel-Cobaltite bilayer <u>Bharat Giri</u> , Xiaoshan Xu
5	Berry Curvature in Magnetic Nanoparticles <u>Ahsan Ullah</u> , Balamurugan Balasubramanian, Bibek Tiwari, Bharat Giri, David J. Sellmyer, Ralph Skomsk, Xiaoshan Xu
6	Interface Charge Engineering in Ferroelectric-Gated Mott Transistors <u>Yifei Hao</u> , Xuegang Chen, Myung-Geun Han, Yuewen Fang, Le Zhang, Hanghui Chen, Yimei Zhu, Xia Hong
7	Magneto-capacitance at the Ni/BiInO₃ Schottky interface <u>Gauthami Viswan</u> , Kun Wang, Po-Shen Lu, Daniel Sando, Robert Streubel, Xia Hong, Valanoor Nagarajan, Archit Dhingra, and Peter A. Dowben
8	Intrinsic Exchange Bias from Interfacial Reconstruction in Epitaxial Ni_xCo_yFe_{3-x-y}O₄(111)/α-Al₂O₃(0001) Thin Films <u>Detian Yang</u> , Arjun Subedi, Yaohua Liu, Chao Liu, Valeria Laiter, Haile Ambaye, Peter A. Dowben, Xiaoshan Xu
9	Simple Visualization of Universal Ferroelastic Domain Walls in Lead Halide Perovskites <u>Bo Zhang</u> , Shuo Sun, Yinglu Jia, Jun Dai, Dhanusha T.N. Rathnayake, Xi Huang, Jade Casasent, Gopi Adhikari, Temban Acha Billy, Yongfeng Lu, Xiao Cheng Zeng, Yinsheng Guo
10	Controlling the Magneto-Optical Response in Ultrathin Films of EuO_{1-x} via Interface Engineering with Ferroelectric BaTi₂O₅ <u>Syed Q. A. Shah</u> , Muhammet Annaorazov, Gaurab Rimal, Jian Wang, Mario F. Borunda, Jinke Tang, and Andrew J. Yost
11	An investigation of the magnetoelectric monopole response in Chromia <u>Syed Q. A. Shah</u> , Ather Mahmood, Arun Parthasarathy, and Christian Binek
12	Study of spin waves in rare-earth garnet TmIG thin films <u>Rupak Timalisina</u> , Haohan Wang, Adam Erickson, Bharat Giri, Xiaoshan Xu, and Abdelghani Laraoui

13	Strain-induced magnetic properties of amorphous iron-germanium films <u>Amir Tarkian</u> , Bryce Herrington, Ruthi Zielinski, Nhat Nguyen, Esha Mishra, Thilini Ekanayaka, ¹ WaiKiat Chin, and Robert Streubel
14	Ferromagnetic resonances in yttrium iron garnet films prepared by metal-organic decomposition epitaxy <u>Bryce Herrington</u> , Ruthi Zielinski, Nhat Nguyen, Szu-Fan Wang, Allen A. Sweet, and Robert Streubel
15	Effects of Boron surface accumulation on the Néel temperature revealed in B-doped Cr₂O₃ films <u>Ather Mahmood</u> , Jamie L. Weaver, Syed Qamar Abbas Shah, Will Echtenkamp, Jeffrey Lynn, Christian Binek
16	Angle-dependent magnetization relaxation in Co/Pt multilayers Nhat Nguyen, Bryce Herrington, Anil Adhikari, Ruthi Zielinski, Shireen Adenwalla, and Robert Streubel
17	A model for electronic phase transitions of CoFe₂O₄ and NiCo₂O₄ thin film surfaces: Temperature dependent X-ray photoemission studies of CoFe₂O₄ and NiCo₂O₄ thin films <u>Arjun Subedi</u> , Detian Yang, Xiaoshan Xu, Peter Dowben
Van der Waals Materials	
18	Ultrafast electron diffraction instrument for gas and condensed matter samples <u>Yibo Wang</u> , Sajib Kumar Saha, Tianlin Li, Yanwei Xiong, Kyle Wilkin, Anil Adhikari, Michael Loes, Jehad Abourahma, Bibek Tiwari, Xia Hong, Shireen Adenwalla, Xiaoshan Xu, Martin Centurion
19	Ferroelectric field effect in few-layer CrCl₃ tunnel junctions top-gated by PbZr_{0.2}Ti_{0.8}O₃ membranes <u>Jia Wang</u> , Yifei Hao, Qiuchen Wu, Kun Wang, Takashi Taniguchi, Kenji Watanabe, and Xia Hong
20	Engineering ferroelectricity and quadruple-well state in CuInP₂S₆ via interfacial PbZr_{0.2}Ti_{0.8}O₃ <u>Kun Wang</u> , Du Li, Jia Wang, Yifei Hao, Hailey Anderson, Li Yang, and Xia Hong
21	Design of Robust h-BN Microdisk Cavities Toward Integrated Quantum Photonics <u>Sanchaya Pandit</u> , Yanan Wang
22	Conductance Fluctuations in graphene with correlated disorder <u>Hamed Vakili</u> , Alexey A. Kovalev
23	The anomalous Hall conductivity of bulk and 2D Cr₂Te₃ <u>Renat Sabirianov</u> , Jaeil Bai (University of Nebraska at Omaha), Mengying Bian (University at Buffalo, State University of New York) Chang Huai (State Univ of NY - Buffalo) Hao Zeng (SUNY Buffalo)

Optical Quantum Materials and Phenomena	
24	Unraveling the aspect-ratio driven evolution of anisotropic homogenization parameters of slanted columnar nanostructures from a wide variety of materials <u>Ufuk Kilic</u> , Yousra Traouli, Matthew Hilfiker, Khalil Bryant, Stefan Schoeche, Rene Feder, Christos Argyropoulos, Eva Schubert, and Mathias Schubert
25	Engineering the broadband enhanced chiral response of L-shaped metamaterials <u>Ufuk Kilic</u> , Matthew Hilfiker, Shawn Wimer, Alex Ruder, Christos Argyropoulos, Eva Schubert, and Mathias Schubert
26	Tunable localized surface phonons SiC nanopillar metamaterial platform <u>Preston Sorensen</u> , Ufuk Kilic, Sean Murray, Mohammed Ghashami, and Mathias Schubert
27	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_xGa_{1-x})₂O₃ Megan Stokey, Rafał Korlacki, Matthew Hilfiker, Teresa Gramer, Jenna Knudtson, Steffen Richter, Sean Knight, Alexis Papamichail, Alyssa Mock, A. Mauze, Y. Zhang, J. Speck, R. Jinno, Y. Cho, H. G. Xing, D. Jena, Y. Oshima, K. Khan, E. Ahmadi, K. Irmscher, Z. Galazka, Vanya Darakchieva, and Mathias Schubert
28	Incorporating species-specific interactions in Monte Carlo ballistic simulations <u>Shawn Wimer</u> , Ufuk Kilic, Mathias Schubert, Eva Schubert
29	In-situ spectroscopic ellipsometry-based real-time growth monitoring of oxygen plasma enhanced ZnO atomic layer deposition process <u>Yousra Traouli</u> , Ufuk Kilic, Sema G. Kilic, Matthew Hilfiker, Alyssa Mock, Derek Sekora, Giselle Melendez, Daniel Schmidt, Mathias Schubert, and Eva Schubert
Atomic and Molecular Quantum Systems	
30	Android Malware Classification Addressing Repackaged Entities By The Evaluation Of Static Features And Multiple Machine Learning Algorithms <u>Md Rashedul Hasan</u>
31	Design and Commissioning of an Octupole Magnetic Trap for Sub-Doppler Cooling of 39K <u>Corbyn Mellinger</u> , David Loos, Benjamin DalFavero, Chance Persons, Joe Klomp, Jonathan Wrubel
32	Properties of an Asymmetric Impurity Implanted into Dipolar Media <u>Neelam Shukla</u> , Artem G. Volosniev, and Jeremy R. Armstrong
33	Optical control of nuclear spin states in a nonmagnetic Eu-based molecular qubit <u>Aleksander L. Wysocki</u> and Karolina Janicka, Kyungwha Park
34	Effect of Capping Layer on Molecular Ferroelectric Thin Film <u>Yuanyuan Ni</u> , Yifan Yuan, Jing Li and Xiaoshan Xu

35	<p>Fabrication of Conducting Polymer Composites of Polyaniline with Spin Crossover Coordination Polymer [Fe(Htrz)₂(trz)](BF₄) with the Addition of Magnetite</p> <p><u>Kayleigh McElveen</u>, Esha Mishra, WaiKiat Chin, Thilini K. Ekanayaka, Suchit Sarin, Jeffrey Shield, Peter A. Dowben, Robert Streubel, Rebecca Y. Lai</p>
36	<p>Synthesis and Characterization of Polypyrrole and Polypyrrole/Fe(Htrz)₂(trz)](BF₄) Composites</p> <p><u>Binny Tamang</u>, Kayleigh A. McElveen, Esha Mishra, Peter A. Dowben, Rebecca Y. Lai</p>
37	<p>Raman Observations of Voltage-controlled Antiferromagnetic Switching in Boron-doped Cr₂O₃</p> <p><u>Shuo Sun</u>, Ather Mahmood, Bo Zhang, Syed Qamar Abbas Shah, Christian Binek and Yinsheng Guo</p>