Northeast Quantum Forum (NEQT) 2024

Conference Calendar

Time	Oct 9	Oct 10	Oct 11
08:00am - 08:30am	breakfast		
08:30am - 09:00am			
09:00am - 09:30am	Tutorial 1: Allan MacDonald	Tutorial 2: Xiaodong Xu	Tutorial 3: Peter Armitage
09:30am - 10:00am			
10:00am - 10:30am	Kin Fai Mak	Qiong Ma	Kemp Plumb
10:30am - 11:00am	break		
11:00am - 11:30am	Long Ju	Nian X. Sun	Mingzhong Wu
11:30am - 12:00pm	Chia-Ling Chien	Luqiao Liu	Fazel Tafti
12:00pm - 12:30pm	Ziqiang Wang	Lucas Caretta	Alberto De la Torre
12:30pm - 01:00pm	lunch		conclusion
01:00pm - 01:30pm			lunch
01:30pm - 02:00pm	Jie Shan	Excursion: Lake Winnipesaukee	
02:00pm - 02:30pm	Gregory Fiete		
02:30pm - 03:00pm	Break		
03:00pm - 03:15pm	Hang Chi		
03:15pm - 03:30pm	Ryotaro Okabe		
03:30pm - 03:45pm	Ari Turkiewicz		
03:45pm - 04:00pm	Nisarga Paul		
04:00pm - 04:30pm	Poster Flash Presentation		
04:30pm - 05:30pm	Poster		
05:30pm - 06:00pm			

Conference Schedule

October 9

08:00 - 09:00	Breakfast
09:00 - 10:00	Tutorial 1 - Allan MacDonald: Modeling Moiré Materials
10:00 - 10:30	Kin Fai Mak: Chiral symmetry breaking in strongly correlated artificial graphene
10:30 - 11:00	Break
11:00 - 11:30	Long Ju: Chiral superconductivity
11:30 - 12:00	Chia-Ling Chien: Half Quantum Flux in Spin Triplet Superconductors
12:00 - 12:30	Ziqiang Wang: Loop current order and roton superconductivity in kagome metals and superconductors
12:30 - 13:30	Lunch
13:30 - 14:00	Jie Shan: Electrical transport in dipolar excitonic insulators
14:00 - 14:30	Gregory Fiete: Optical probing and control of 2D Materials
14:30 - 15:00	Break
15:00 - 15:15	Hang Chi: Interface modulated magnetic transition metal chalcogenides
15:15 - 15:30	Ryotaro Okabe: Structural Constraint Integration in Generative Model for Discovery of Quantum Material Candidates
15:30 - 15:45	Ari Turkiewicz: Combining molecular beam epitaxy with topochemistry to synthesize the superconducting candidate La_2NiO_3F
15:45 - 16:00	Nisarga Paul: Engineering Higher Hall Crystals
16:00 - 18:00	Poster Flash Presentation
18:00 - 18:30	Poster
18:30 onwards	Dinner

October 10

08:00 - 09:00	Breakfast
09:00 - 10:00	Tutorial 2 - Xiaodong Xu: Fractional Quantum Hall Effect
10:00 - 10:30	Qiong Ma: Topology and Correlations in Monolayer $TaIrTe_4$
10:30 - 11:00	Break
11:00 - 11:30	Nian X. Sun: RF Magnetoelectrics - Materials and Microsystems
11:30 - 12:00	Luqiao Liu: Large Spin Polarization from Symmetry-Breaking Antiferromagnets
12:00 - 12:30	Lucas Caretta: Unconventional Polar Phenomena in Epitaxial Magnetic Heterostructures
12:30 - 13:30	Lunch
13:30 onwards	Excursion: Lake Winnipesaukee area
18:30 onwards	Dinner

October 11

08:00 - 09:00	Breakfast
09:00 - 10:00	Tutorial 3 - Peter Armitage: Energy relaxation and dynamics in strongly correlated metals
10:00 - 10:30	Kemp Plumb: Scalar chiral stripe order and time reversal symmetry breaking in a frustrated itinerant magnet
10:30 - 11:00	Break
11:00 - 11:30	Mingzhong Wu: Topological Surface States in Alpha-Sn
11:30 - 12:00	Fazel Tafti: Chemical and physical routes towards the Kitaev spin liquid
12:00 - 12:30	Alberto De la Torre: Towards Floquet Engineering of Unconventional Magnetism in Kitaev Magnets
12:30 - 13:00	Conclusion
13:00 - 14:00	Lunch

Abstracts

Modeling Moiré Materials

Allan MacDonald

University of Texas Austin

TBD

Chiral symmetry breaking in strongly correlated artificial graphene

Kin Fai Mak

Cornell University

The realization of graphene has provided a platform to explore the physics of two-dimensional massless Dirac fermions with well-defined chiralities. It has been speculated that the electron-electron interactions in graphene could break the chiral symmetry to induce a finite mass for Dirac fermions, in analog to dynamical mass generation in elementary particles. However, such a phenomenon has not been observed in pristine graphene because the interaction strength is insufficient. In this talk, I will discuss the realization of strongly correlated artificial graphene and the observation of spontaneous chiral symmetry breaking in twisted WSe_2 tetralayers. Using magneto transport, I will show the emergence of massless Dirac fermions in the first Γ-valley moiré valence band. I will then demonstrate a semimetal-to-insulator transition induced by the enhanced interaction effects in small twist angle samples; the emergent insulator is compatible with a Mott insulator.

Chiral superconductivity

Long Ju

Massachusetts Institute of Technology

TBD

Half Quantum Flux in Spin Triplet Superconductors

Chia-Ling Chien

Johns Hopkins University

Most superconductors (SCs) are spin singlet SCs, mainly s-wave (e.g., Nb) and some d-wave (e.g., high T_C cuprates). Spin triplet SCs, essential for Majorana physics and fault tolerant quantum computing, are rare and difficult to identify using thermodynamic measurements and NMR Knight shift with Sr_2RuO_4 as a notable disappointment. We instead use phase-sensitive method to identify triplet SCs, which have odd-parity gaps as opposed to the even-parity gaps in singlet SCs. We have observed half quantum flux (HQF) of $(n + ½)\Phi_0$ in sub-μm rings of spin triplet β-Bi_2Pd, instead of integer flux $n\Phi_0$ universally observed in SC rings, where $\Phi_0 = hc/2e$ is the flux quantum and n an integer [1]. Very recently, we have fabricated GLB composite rings of two SCs, as first proposed by Geshkenbein, Larkin, and Barone (GLB) [2], to unequivocally identity any singlet or triplet SC [3].

References:

1. Yufan Li, Xiaoying Xu, M. H. Lee, M. W. Chu, and C. L. Chien, Science, 366, 238 (2019).
2. V. B. Geshkenbein, A. I. Larkin, and A. Barone, Phys. Rev. B 36, 235 (1987).
3. Xiaoying Xu, Yufan Li, and C. L. Chien, Phys. Rev. Lett. 132, 056001 (2024).

Loop current order and roton superconductivity in kagome metals and superconductors

Ziqiang Wang

Boston College

Central to the vanadium-based, nonmagnetic kagome metals and superconductors AV_3Sb_5 (A=K, Cs, Rb) is a cascade of correlated quantum states triggered by an unconventional charge density wave (CDW) order. We discuss recent experimental findings, focusing on evidence for time-reversal symmetry breaking in both the normal and the superconducting state. We argue that the essential phenomenology can be captured by a 3Q CDW with loop current order, realizable in models with extended Coulomb interactions on the kagome lattice. The loop-current Chern metal has a partially filled Chern band and Chern Fermi pockets carrying concentrated Berry curvature. We show how Cooper pairing over the Chern Fermi pockets produces a novel roton superconductor, where the internal phases of three pairing components are locked at 120-degrees and loop supercurrents circulate around a vortex-antivortex lattice with pair density modulations. We discuss the extraordinary properties of this chiral topological superconductor in connection to the experimental observation of charge-6e flux quantization and superconductivity.

Electrical transport in dipolar excitonic insulators

Jie Shan

Cornell University

Excitonic insulators (EIs) emerge in semiconductors when the electron-hole binding energy exceeds the band gap. Whereas the charged excitations are frozen and unable to transport current, the neutral electron-hole pairs (excitons) are free to move in EIs. Dipolar EIs based on Coulomb-coupled atomic double layers allow us to explore exciton transport in EIs because separate electrical contacts can be made to the electron and hole layers. In this talk, I will discuss the transport properties of dipolar EIs realized in Coulomb-coupled $WSe_2/MoSe_2$ hetero-bilayers. I will also discuss the physics of doped EIs and the emergence of a trion Fermi liquid.

Optical probing and control of 2D Materials

Gregory Fiete

Northeastern University

Illuminating a material with light can reveal both interesting aspects of electronic and lattice degrees of freedom, as well as drive phase and topological transitions in the material itself. In this talk, I will focus on three distinct responses of a material to light: (1) Nonlinear phononic control of magnetism in bilayer CrI_3, $MnBi_2Te_4$, and $MnSb_2Te_4$. (2) The non-linear photogalvanic response of Weyl semimetals with tilted cones and chiral charge up to 4 (the largest allowed in a lattice model), as well as the topological superconductor candidate 4Hb-TaS_2, and (3) The coupling of phonons to electronic degrees of freedom to produce chiral phonons with large g-factors of order 1, which can be measured with Raman scattering.

Interface modulated magnetic transition metal chalcogenides

Hang Chi

University of Ottawa

Novel quasi-2D magnets are attracting much attention recently. In situ prepared sharp interfaces are desirable for strain engineering and/or hybridizing with other quantum systems, enabling fundamentally new phenomena and opportunities for spintronics. Ferromagnetic Cr_2Te_3 ultrathin films, optimally grown on Al_2O_3(0001) and $SrTiO_3$(111) using molecular beam epitaxy, manifest an extraordinary sign reversal in the anomalous Hall conductivity as temperature and/or strain are modulated. The nontrivial Berry curvature in the electronic-structure momentum space is believed to be responsible for this behavior [Nat. Commun. 14, 3222 (2023)]. Furthermore, when proximitized with $(Bi,Sb)_2Te_3$-type topological insulator, via the Bloembergen-Rowland interaction, magnetic ordering in monolayer Cr_2Te_3 is favorably enhanced, displaying an increased Curie temperature [arXiv:2312.15028]. Combining ab initio simulation, advanced scanning tunneling microscopy, magnetic force microscopy, transmission electron microscopy, magneto transport and particularly depth-sensitive polarized neutron reflectometry, Cr_2Te_3 has been established as a far-reaching platform for further investigating the marriage of magnetism and topology. These findings provide new perspectives to the magnetic topological materials in general, that are topical for the future development of topological spintronics.

Keywords: 2D Ferromagnetism, Exchange coupling, Band topology

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Structural Constraint Integration in Generative Model for Discovery of Quantum Material Candidates

Ryotaro Okabe

Massachusetts Institute of Technology

Billions of organic molecules are known, but only a tiny fraction of the functional inorganic materials have been discovered, a particularly relevant problem to the community searching for new quantum materials. Recent advancements in machine-learning-based generative models, particularly diffusion models, show great promise for generating new, stable materials. However, integrating geometric patterns into materials generation remains a challenge. Here, we introduce Structural Constraint Integration in the GENerative model (SCIGEN). Our approach can modify any trained generative diffusion model by strategic masking of the denoised structure with a diffused constrained structure prior to each diffusion step to steer the generation toward constrained outputs. Furthermore, we mathematically prove that SCIGEN effectively performs conditional sampling from the original distribution, which is crucial for generating stable constrained materials. We generate eight million compounds using Archimedean lattices as prototype constraints, with over 10% surviving a multi-staged stability pre-screening. High-throughput density functional theory (DFT) on 26,000 survived compounds shows that over 50% passed structural optimization at the DFT level. Since the properties of quantum materials are closely related to geometric patterns, our results indicate that SCIGEN provides a general framework for generating quantum materials candidates.

Combining molecular beam epitaxy with topochemistry to synthesize the superconducting candidate La_2NiO_3F

Ari Turkiewicz

Harvard University

Since the discovery of superconductivity in infinite-layer nickelates, there have been continuous efforts to identify related materials with improved properties. Theoretical and experimental studies suggest that increasing the dimensional confinement across nickel oxide layers will lead to more 'cuprate-like' physics and higher superconducting critical temperatures. Here, we target the n = 1 Ruddlesden-Popper phase, La_2NiO_4, which boasts single layers of electronically isolated nickel oxide. In the parent structure, nickel adopts a 2+ oxidation state with ground state antiferromagnetic ordering. Notably, the ground state magnetic structure of the high-T_C cuprates is proximate to an antiferromagnetically ordered phase. We therefore use two complementary methods to tune the nickel valence and ground-state magnetic properties. First, we use molecular-beam epitaxy (MBE) to synthesize thin films of the general formula $La_{2-x}A_xNiO_4$ (A = Sr, Ba) where nickel adopts an oxidation state of 2+x. After MBE synthesis, we leverage topochemical transformations including fluorine substitution and reductive de-intercalation [1,2] to synthesize thin films of the general formula $La_{2-x}A_xNiO_3F_{2-y}$ where nickel adopts an oxidation state of 2+x–y. Through these two methods, we can both electron- and hole-dope the nickel oxide layer, systemically probing the effect of valence on magnetic and electronic properties.

References:

1. Inorg. Chem. 2018, 57, 6549–6560
2. Chem. Mater. 2020, 32, 3160–3179

Engineering Higher Hall Crystals

Nisarga Paul

Massachusetts Institute of Technology

Recent predictions and possible discoveries of quantum anomalous Hall states in moiré materials have revived interest in Hall crystals, phases of matter where crystalline order with quantum Hall physics coexist. In this talk, we introduce a novel platform for realizing interaction-driven 'higher' Hall crystals with diverse Chern numbers with $|C| > 1$, which have remained elusive in traditional quantum Hall systems. Our approach involves subjecting a two-dimensional semiconductor or graphene to a magnetic field and a one-dimensional periodic potential, mimicking aspects of moiré physics. We demonstrate how electron interactions can drive the spontaneous formation of these higher Hall crystals, which can be combined with an interpretation as a "spontaneous" Hofstadter effect. We discuss potential experimental realizations and the broader implications for (anomalous) Hall states in two-dimensional materials.

Topology and Correlations in Monolayer $TaIrTe_4$

Qiong Ma

Boston College

I will present experimental studies on the topological and correlated properties of monolayer $TaIrTe_4$. First, I will discuss a dual quantum spin Hall (QSH) insulator, arising from the interplay between its single-particle topology and density-tuned correlations. At charge neutrality, monolayer $TaIrTe_4$ exhibits QSH insulator behavior, characterized by enhanced nonlocal transport and quantized helical edge conductance. Upon introducing electrons from charge neutrality, $TaIrTe_4$ only shows metallic behavior in a small range of charge densities but quickly goes into a new insulating state. This insulating state could arise from a strong electronic instability near the van Hove singularities, likely leading to a charge density wave. Within this correlated insulating gap, we observe a resurgence of the QSH state. If time permits, I will also discuss our recent efforts to study this correlated gap using nonlinear Hall responses.

RF Magnetoelectrics - Materials and Microsystems

Nian X. Sun

Northeastern University

The coexistence of electric polarization and magnetization in multiferroic materials provides great opportunities for realizing magnetoelectric coupling, including electric field control of magnetism, or vice versa, through a strain-mediated magnetoelectric coupling in layered magnetic/ferroelectric multiferroic heterostructures. Strong magnetoelectric coupling has been the enabling factor for different multiferroic devices, which, however, has been elusive, particularly at RF/microwave frequencies. In this presentation, I will cover the most recent progress on new RF magnetoelectric materials and microsystems [1-8]. Specifically, we will introduce magnetoelectric materials and their applications in different devices, focusing on ultracompact magnetoelectric mechanical antennas, which are immune from ground plane effect with ultra-compact size, self-biased operation, excellent impedance matching, ground plane immunity, etc. These magnetodielectric and magnetoelectric antennas show great promise for applications in compact, lightweight, and power-efficient sensors, antennas, and tunable components for radars, communication systems, biomedical devices, IoT, etc.

References:

1. B. Luo, et al. Nature Reviews Electrical Engineering, 1, 317-334 (2024).
2. X. Liang, et al. Advanced Engineering Materials, 2300425 (2023).
3. C Dong, et al., Advanced Electronic Materials 8 (6), 2200013 (2022).
4. M. Zaeimbashi, et al, Nature Comm. 12, 3141 (2021).
5. C. Dong, et al. IEEE Antennas and Wireless Propagation Letters 19 (3), 398-402 (2020).
6. M. Zeimbashi, IEEE J-ERM, 3, 206 (2019).
7. C. Dong, et al. Applied Physics Letters 113 (26), 262401 (2018).
8. T. Nan, et al. Nature Comm. 8, 296 (2017).

Large Spin Polarization from Symmetry-Breaking Antiferromagnets

Luqiao Liu

Massachusetts Institute of Technology

Efficient detection of magnetic state is one of the critical steps towards useful antiferromagnet-based spintronic devices. Along this line, finite tunneling magnetoresistance (TMR) has been recently demonstrated in tunnel junctions with antiferromagnetic electrodes. However, the studies have been mostly limited to junctions with two identical antiferromagnet (AFM) electrodes, where the matching of the spin-split Fermi surfaces plays a critical role. It remains unclear if AFMs can provide a finite net spin polarization to other components in spintronic devices and circuits, and hence be used as a universal spin polarizer or detector. In this work, we experimentally fabricate single-sided antiferromagnetic tunnel junctions consisting of one topological AFM electrode and one ferromagnet (FM) electrode, where the spin polarized tunneling transport from AFM is examined with the FM layer. We observe a high TMR (>100%) in these asymmetric AFM tunnel junctions, suggesting a large effective spin polarization from the AFM despite its nearly vanishing magnetization. The large TMR is consistent with the theoretical understanding where the broken symmetry in non-collinear AFMs is predicted to lift the spin degeneracy in the band structure. The evidence that spin polarized electrical transport can be achieved from AFM opens up the avenue of using AFM as a general purpose polarizer for generating spin current, as well as for manipulating magnetic dynamics.

Energy relaxation and dynamics in strongly correlated metals

Peter Armitage

Johns Hopkins University

Physical systems may be characterized by various rates of relaxation from different perturbations. The relation between the rates may give interesting insight into the various microscopic processes. Discriminating the effects of different kinds of scattering in strongly interacting metals is crucial in their understanding. While momentum loss or current relaxation can be readily probed via dc resistivity or optical/THz spectroscopy, discriminating other kinds of scattering can be more challenging. In this work we argue that the nonlinear optical technique of THz 2D coherent spectroscopy measures the energy relaxation rate in strongly interacting metals. We apply the technique to a number of interacting metals, which gives insight into their microscopic physics.

Scalar chiral stripe order and time reversal symmetry breaking in a frustrated itinerant magnet

Kemp Plumb

Brown University

In frustrated antiferromagnets, competing magnetic interactions act to prevent the formation of collinear Néel ordering and in many cases can stabilize complex, multi-sublattice, magnetic structures. Such magnetic structures may have a vanishing net magnetization and still generate fictitious magnetic fields that can couple to, and influence, conduction electrons. Thus, metallic frustrated magnets hold great promise for fast and low dissipation spintronic devices. One well established mechanism involves a real-space Berry curvature that is associated with non-coplanar magnetic structures having a uniform scalar spin chirality. In the presence of spin-orbit coupling, collinear and coplanar magnetic structures can also induce a Berry phase i.e. even in the absence of a uniform scalar chirality. However, this spin-orbit coupling mechanism remains much less explored. In this talk, I will discuss recent resonant elastic x-ray scattering results on the itinerant triangular lattice magnet $CoNb_3S_6$ exhibiting a large intrinsic anomalous Hall response. The measurements reveal a unique double-Q magnetic ordering that corresponds to a staggered, stripey, ordering of scalar spin chirality in $CoNb_3S_6$. The observed magnetic order explains the Hall response through a spin orbit coupling mechanism and is naturally stabilized by a magnetic Hamiltonian that is frustrated in momentum space and contains strong four-spin (biquadratic) interactions. These establish spin-orbit coupling as an equally effective mechanism to scalar spin chirality for generating an anomalous Hall response in frustrated magnets. Together, the clean demonstration of four-spin interactions and spin-orbit coupling mechanism greatly broaden the materials possibilities for tunable anomalous Hall response and spintronic applications based on frustrated magnets.

Topological Surface States in Alpha-Sn

Mingzhong Wu

Northeastern University

Among topological Dirac semimetals, -Sn is unique because (1) it is a single-element material and is therefore relatively easy to grow and (2) it can be transformed into other topological phases, such as a topological insulator or a Weyl semimetal, under strains or external fields. I will discuss our recent experimental work on -Sn thin films. I will present in particular four effects associated with the topological surface states: (1) Large damping enhancement in a ferromagnetic thin film due to the presence of surface states in an adjacent -Sn thin film; (2) Current-induced magnetization switching via surface states in an -Sn/Ag/CoFeB trilayer; (3) Spin-momentum-locking driven large magnetoresistance in -Sn thin films that scales linearly with both magnetic and electric fields; (4) quantum oscillations of surface states. These results indicate that topological Dirac semimetal -Sn holds exciting promise of application in next-generation electronics and quantum technologies.

Unconventional Polar Phenomena in Epitaxial Magnetic Heterostructures

Lucas Caretta

Brown University

Crystal symmetry in condensed-matter materials largely dictates their micro- and macroscopic properties and, in turn, their functionalities. A key challenge in quantum materials is to stabilize and control symmetry breaking in polar materials. To this end, the intimate coupling between spin, charge, and lattice degrees of freedom in complex oxides provides a platform to manifest correlations between broken inversion symmetry and materials properties. Polar materials, such as ferroelectrics, are a particularly pervasive example of broken inversion symmetry. Here, we show pathways by which symmetry in unconventional phenomena in polar materials can be engineered via epitaxial constraints. First, by engineering octahedral tilt distortions in epitaxial multiferroic superlattices, we demonstrate that electric (polar) fields can be used to both erase and introduce centrosymmetry, effectively erasing and writing ferroelectric order, and resulting in orders-of-magnitude changes in the nonlinear optical response, resistivity, and piezoresponse. Second, we show that epitaxial strain and heterostructure boundary conditions in non-centrosymmetric oxide metals can be used to establish multiferroic order and topological defects in ultrathin films.

Chemical and physical routes towards the Kitaev spin liquid

Fazel Tafti

Boston College

Achieving a quantum spin liquid phase remains a frontier goal in condensed matter physics. The limited number of candidate material is a major challenge. In this talk, I will present our latest results in using topotactic exchange reactions to design new candidates of the Kitaev spin liquid phase. Compounds with 3d, 4d, and 5d transition metals will be explored. I will also show recent results where pressure has been used as a tuning parameter in a 4d honeycomb system.

Towards Floquet Engineering of Unconventional Magnetism in Kitaev Magnets

Alberto De la Torre

Northeastern University

TBD

Poster Presentations

PRESENTER	TITLE
Margaret Anderson Harvard University	Defect-engineering in Thin Films of the Quantum Spin Liquid Candidate $Tb_2Ti_2O_7$
Muhammad Awais Fiaz University of New Hampshire	Metallic Mosaic Phases in 1T-TaS_2 Material
Yoony Baek Harvard University	Synthesis and Characterization of Molybdate Pyrochlore Thin Films Near Phase Boundary
Vsevolod Belosevich Boston College	TBD
Justin Dickovick Northeastern University	Evolution of ferromagnetic resonance properties in multi-layered FeGa/B thin films on piezoelectric $LiNbO_3$ substrates
Jacob Feinstein Worcester Polytechnic Institute	Net Magnetic Moment Extraction from Noisy Magnetic Field Image Data using Deep Convolutional Neural Networks
Natalie Frey Worcester Polytechnic Institute	Magnetic Imaging with Nitrogen-Vacancy Centers in Diamond
Tonghang Han MIT	Signatures of Chiral Superconductivity in Rhombohedral Graphene
Sona Hanslia Worcester Polytechnic Institute	Magnetic Imaging with Nitrogen-Vacancy Centers in Diamond
Suman Itani University of New Hampshire	Northeast Materials Database (NEMAD): A Public Magnetic Database for Screening High Transition Temperature Magnetic Compounds
Vijaysankar Kalappattil Northeastern University	Quantum Transport in Sputtered Topological Semimetal alpha-Sn Thin Films
Serhii Kryhin Harvard University	Non-linear Response in Strange Metals
Karen Lei MIT	Determining the Ground State of the Ferromagnetic Kondo Lattice Model
Philippe Lewalle University of California, Berkeley	The Zeno Effect: a Versatile Tool for Quantum Control and Computation
Wenxin Li Yale University	Role of Fe intercalation on the electronic correlation in resistively switchable antiferromagnet Fe_xNbS_2
Jiahao Liang The Johns Hopkins University	Investigating Amplitude Mode in Lanthanum Cuprates Using THz 2D Coherent Spectroscopy
Zhengguang Lu MIT	Extended Quantum Anomalous Hall States in Graphene/hBN Moiré Superlattices
Bin Luo Northeastern University	Intrinsic Magnetotransport and Magnetization Dynamics of the $Y_3Fe_5O_{12}/Bi_2Te_3$ Interface at Low Temperature

Edward Mercer Northeastern University	RIXS of charge transfer Nickelates
Liam Mitchell Brown University	TBD
Yugo Onishi MIT	Universal bound in topological phases of matter
Nisarga Paul MIT	TBD
Sergey Pershoguba University of New Hampshire	Dynamical Stark Shift in Solids
Houssam Sabri University of New Hampshire	Non-Monotonicity of Hall resistivity in disordered multidomain ferromagnet
Liam Schmidt Northeastern University	X-Ray Spectroscopy of 2D Magnets
Vipul Sharma Northeastern University	Fabrication of a-plane Barium Hexaferrite thin film with Low FMR Linewidth using PLD
Anderson Steckler University of New Hampshire	Modeling quasiparticle interference between quantum defects on graphene
Tommy Tai MIT	Origin of unconventional residual Hall effects in chiral and achiral multilayers
Koichiro Takahashi University of New Hampshire	Symmetry and Tight-binding modeling of Altermagnet candidate MnTe
Raisa Trubko Worcester Polytechnic Institute	Magnetic Imaging with Nitrogen-Vacancy Centers in Diamond
Ari Turkiewicz Harvard University	Combining molecular beam epitaxy with topochemistry to synthesize the superconducting candidate La_2NiO_3F
Rolando Valdes Aguilar NIST	Search for Topological Magnons in non-collinear magnet $MnTe_2$
Qiaochu Wang Brown University	Pulling order back from the brink of disorder
Tyler Werner Yale University	Deciphering the Record High T_c vdW Ferromagnet Ni-Fe_5GeTe_2
George Yumnam Oak Ridge National Laboratory	Strongly coupled magnon and crystal field spectra as an origin for strong magnetoelasticity in TbSb
Keyu Zeng Boston College	Understanding the Electronic Structure of '135' family of Kagome Metals
Shiyu Zhou Brown University	Out of plane spin torque generated by PIO