

Program Schedule

QMAT 2024

Organized by IIT Guwahati, 20th -23rd December 2024

Day 0, 20th Dec 2024 (Friday):

Time	Events
12:00-15:00	Registration & Lunch
15:00-15:30	Inauguration
15:30-16:00	High Tea
16:00-17:00	Public Lecture (Mandar M. Deshmukh, TIFR Mumbai, India)
17:00-19:00	Registration Continued
19:00-onwards	Dinner

Day 1, 21st Dec 2024 (Saturday):

Time	Speaker	Title of the talk
Day 1: Parallel Session-1	<i>Session Chair: Rajdeep Sensarma</i>	
7:30-9:00	Breakfast & Registration	
9:00 - 9:30	Diptiman sen	Kinetically constrained models showing Hilbert space fragmentation
9:30 - 10:00	Ajit C Balram	Static structure factor and the dispersion of the Girvin-MacDonald-Platzman density-mode for fractional quantum Hall fluids on the Haldane sphere
10:00 - 10:15	Manodip Routh	Emergent Quadrupolar Order in the Spin-1/2 Kitaev-Heisenberg Model
10:15 - 10:30	Ankit Gill	Speed Limits and Scrambling in Krylov Space
10:30 -11:00	Tea/Coffee	
Day 1: Parallel Session-1	<i>Session Chair: Diptiman Sen</i>	
11:00 - 11:30	Sumilan Banerjee	Measurement-Induced Superconductor-

		Insulator Transition in Weakly Monitored Josephson Junction Arrays
11:30 - 12:00	Rajdeep Sensarma	Phase Transitions in Twisted Bilayer Graphene
12:00 - 12:15	Subhasis Shit	Reducing the vortex entanglement via Pb substitution in the charge reservoirs of Bi-2212 superconductor
12:15 - 12:30	V. Jyothis	Stability of Topological Magnons on Pyrochlore Lattice: The Role of Interactions
12:30 - 14:00	Lunch	
Day 1: Parallel Session-1	<i>Session Chair: Mandar M. Deshmukh</i>	
14:00 - 14:30	Satyajit Banerjee	Exploration of emergent rich strongly correlated state in SmB_6 and a comparison of this system with a conventional topological insulator Bi_2Se_3
14:30 -15:00	Ravi Prakash Singh	Superconducting Natural Heterostructures: A Novel Platform for Unconventional Superconductivity
15:00 -15:15	Shubham Patel	Electron-phonon coupling, critical temperatures and gaps in $\text{NbSe}_2/\text{MoS}_2$ Ising Superconductors
15:15 -15:30	Souvik Banerjee	Unconventional vortex states in the Chevrel phase superconductor PbMo_6Se_8
15:30 - 16:00	Tea/Coffee	
Day 1: Parallel Session-1	<i>Session Chair: Satyajit Banerjee</i>	
16:00-16:30	Sudeep Kumar Ghosh	Origin of Sign change in Thermopower of Strained Sr_2RuO_4
16:30 - 17:00	Mintu Mondal	Exceptionally slow and long-range critical fluctuations anticipate the singularity in second order phase transition
17:00- 17:15	Supriya Ghosal	Bi based half-Heusler alloys: Potential candidates for thermoelectric applications
17:15- 17:30	Sorav Karan	Robust and Thermally Stable Pinning Mechanisms Behind the High J_c State of HTSC-TMC NPs Nanocomposites

17:30 - 18:00	Tea/Coffee
17:30-19:00	Poster presentation/Scientific Discussions
19.00 onwards	Banquet Dinner

Day 1: Parallel Session-2	<i>Session Chair: Vidya Kochat</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast & Registration	
9:00 - 9:30	Debraj Choudhury	Tuning dielectric responses and polar-instabilities in orthorhombic rare-earth chromates
9:30 - 10:00	Tamalika Banerjee	Large Tunneling magnetoresistance in all-oxide magnetic tunnel junctions with perpendicular magnetic anisotropy
10:00 - 10:15	Sudipta Chakrabarty	Optically enhanced negative differential resistance in reduced graphene oxide coated silicon nanorods
10:15 - 10:30	Mouli Roy Chowdhury	Frustration driven low-temperature spin-glass behavior and short-range correlations in tri-cation spinel
10:30 -11:00	Tea/Coffee	
Day 1: Parallel Session-2	<i>Session Chair: Tamalika Banerjee</i>	
11:00 - 11:30	Ashis Kumar Nandy	Tailoring Topological Phases and Anomalous Hall Effect in Noncollinear Antiferromagnets
11:30 - 12:00	Biplab Sanyal	Complex magnetism and spin transport in two-dimensional magnets
12:00 - 12:15	Simrandeep Kaur	Controlling the Particle-hole symmetry in fractional Quantum Hall state in ABA trilayer graphene.
12:15 - 12:30	Mijanur Islam	Electron-phonon coupling induced topological phase transition in an α - T_3 Haldane-Holstein model
12:30 - 14:00:	Lunch	
Day 1: Parallel Session-2	<i>Session Chair: Tulika Maitra</i>	

14:00 - 14:30	Vidya Kochat	Broken symmetry quantum Hall states, layer hybridization and screening effects in twisted bilayer graphene at intermediate angles
14:30 -15:00	Kausik Majumdar	Exciton-Exciton Interaction in a Moiré Superlattice: Repulsive or Attractive?
15:00 -15:15	Hilol Biswas	Various phases of a discrete time crystal in driven central spin model
15:15 -15:30	Sibaram Ruidas	Onset and growth of many-body classical chaos
15:30 - 16:00:	Tea/Coffee	
Day 1: Parallel Session-2	<i>Session Chair: Chandra Shkehar Yadav</i>	
16:00-16:30	Anindya Das	Thermopower probing emergent local moments in magic-angle twisted bilayer graphene
16:30 - 17:00	Atindra Nath Pal	Nontrivial transport in driven by charge-density-wave in 1T-TaS ₂
17:00- 17:15	Ajit Kumar Dash	Utilizing low energy electron beam irradiation for ultrasharp single photon emitter generation in monolayer transition metal dichalcogenides
17:15- 17:30	Ajay Pratap Singh Rana	Spin caloritronics and magneto-thermoelectric effect in two-dimensional magnetic materials
17:30-19:00	Poster presentation/Scientific Discussions	
19.00 pm onwards	Banquet Dinner	

Day 1: Parallel Session-3	<i>Session Chair: Anindya Das</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast & Registration	
9:00 - 9:30	Chandan Bera	Electron and phonon transport properties in two-dimensional magnetic materials
9:30 - 10:00	Prasana Kumar Sahoo	Engineering Excitons in 2D Lateral Heterostructures and Devices

10:00 - 10:15	Nikhil Malviya	Experimental Extraction of Phonon Scattering Lifetimes in vdW Materials Using Transient Grating
10:15 - 10:30	Manvi Verma	Digital Twin Enabled Understanding and Modulation of Nucleation Density for Optimized 2D Material Synthesis
10:30 -11:00	Tea/Coffee	
Day 1: Parallel Session-3	<i>Session Chair: Anamitra Mukherjee</i>	
11:00 - 11:30	Angom Dilip Kumar Singh	Topological entanglement entropy from exact diagonalization
11:30 - 12:00	Amal Medhi	Convolutional restricted Boltzmann machine correlated variational wave function for the Hubbard model on a square lattice
12:00 - 12:15	Kuntal Bhattacharyya	Topological phase transition through electron-phonon interaction in an alpha-T3 quantum spin Hall insulator
12:15 - 12:30	Anirban Das	Generation of Macroscopic Entanglement via Quantum Annealing
12:30 - 14:00:	Lunch	
Day 1: Parallel Session-3	<i>Session Chair: Biplab Sanyal</i>	
14:00 - 14:30	Anjan Barman	Ultrafast Magnetization Dynamics in 2D Material/Ferromagnet Heterostructures
14:30 -15:00	Swapan K Pati	Computational Modeling of Materials for Energy Storage and Generation
15:00 -15:15	Sk Kalimuddin	Free Sliding Charge Density Wave: A Dynamical Critical Phenomenon
15:15 -15:30	Sagnik Chaudhuri	Stability of Emergent Conservation Laws in Periodically Driven Quantum Systems
15:30 - 16:00:	Tea/Coffee	
Day 1: Parallel Session-3	<i>Session Chair: Arnab Sen</i>	
16:00-16:30	Vijay Shenoy	Edge Theories of Fractonic Systems
16:30 - 17:00	Anamitra Mukherjee	Spin-excitations of low-dimensional cuprates beyond linear response

17:00- 17:15	Ramita Sarkar	A maximum concurrence criteria to investigate absolutely maximally entangled states
17:15- 17:30	Tista Banerjee	Entanglement transitions and role of emergent symmetry in non-Hermitian integrable Floquet systems
17:30-19:00	Poster presentation/Scientific Discussions	
19.00 onwards	Banquet Dinner	

Day 2, 22nd Dec 2024 (Sunday):

Day 2: Parallel Session-1	<i>Session Chair: Arijit Saha</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Tanmoy Das	Fractional, Entangled and Quasi Orbitals
9:30 - 10:00	Aveek Bid	Universality of quantum phase transitions in the integer and fractional quantum Hall regimes
10:00 - 10:15	Nilanjan Roy	Superlattice induced electron percolation within a single Landau level
10:15 - 10:30	Saikat Mondal	Percolation transition in a topological phase
10:30 -11:00:	Tea/Coffee	
Day 2: Parallel Session-1	<i>Session Chair: Tanmoy Das</i>	
11:00 - 11:30	Arijit Saha	Distinguishing between topological Majorana and trivial zero modes via transport and shot noise study in an altermagnet heterostructure
11:30 - 12:00	Soumya Bera	Many-body localization dynamics
12:00 - 12:15	Subhamita Sengupta	Inverse Melting in A Pinned Vortex Liquid
12:15 - 12:30	Pooja Saini	Revival of the Hofstadter butterfly in the Presence of various disorders and Correlation Strength
12:30 - 14:00:	Lunch	

Day 2: Parallel Session-1	<i>Session Chair: Ravi Prakash Singh</i>	
14:00 - 14:30	Ajaya Kumar Nayak	Non-coplanar magnetic structure driven Large Anomalous Hall Effect in electron doped Mn ₃ Sn
14:30 -15:00	Kalpataru Pradhan	Strain-driven magnetic reorientation in transition metal oxides
15:00 -15:15	Mantu Modak	Unusual magnetic properties of TbRu ₂ Ge ₂ compound
15:15 -15:30	Arun B	2D broadband FMR data acquisition with Vector Network Analyzer and Determination of Asymptotic Lande g-Factor
15:30 - 16:00:	Tea/Coffee	
Day 2: Parallel Session-1	<i>Session Chair: Pratap Roychaudhuri</i>	
16:00-16:30	Mandar M Deshmukh	High temperature Josephson diode
16:30 - 17:00	Chandra Sekhar Yadav	Signature of point nodal superconductivity in the Dirac semimetal PdTe
17:00- 17:15	Debika Debnath	Diode effect in quantum dot-based Josephson junction
17:15- 17:30	Somak Basistha	Linear and Non-Linear response in the mixed state of superconducting NbN and α -MoGe thin films using a low-frequency two-coil mutual inductance technique
17:30 - 18:00:	Tea/Coffee	
17:30-19:00	Poster presentation/Scientific Discussions	
19.00 pm onwards:	Dinner	

Day 2: Parallel Session-2	<i>Session Chair: Sudip Chakraborty</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Indra Dasgupta	Spin-orbit driven emergent phases in quantum materials

9:30 - 10:00	Amrita Bhattacharya	In search of spin orbit driven ferroelectric Rashba switches in Perovskite oxides
10:00 - 10:15	Dipanwita Bhattacharjee	Influence of band convergence on the thermoelectric transport properties of CoBi-based half-Heusler alloys
10:15 - 10:30	Ankita Bhattacharya	Electric field induced second-order anomalous Hall transport in unconventional Rashba system
10:30 - 11:00:	Tea/Coffee	
Day 2: Parallel Session-2	<i>Session Chair: Indra Dasgupta</i>	
11:00 - 11:30	Prasanjit Samal	Generalized Dielectric-Dependent Hybrids: A New Computational Window for Bulk to Nano-structured Quantum Materials
11:30 - 12:00	Sudip Chakraborty	Computational Roadmap of Emerging Materials: Implications of Piezochromism and Rashba Physics
12:00 - 12:15	Subhajyoti Pal	Theoretical analysis of multi-spin Excitations in 2D Antiferromagnet probed by Resonant Inelastic X-ray Scattering (RIXS)
12:15 - 12:30	Himangshu Sekhar Sarmah	Non-volatile electrically switchable spintronics properties in MXenes based heterostructures
12:30 - 14:00:	Lunch	
Day 2: Parallel Session-2	<i>Session Chair: Prasanjit Samal</i>	
14:00 - 14:30	Bhaskaran Muralidharan	Spin-valley quantum states in TMDC quantum dots
14:30 - 15:00	Arnab Sen	Fate of many-body localization in an Abelian lattice gauge theory
15:00 - 15:15	Snehasish Sen	Theory of Polar Skyrmions in Layered Structure of Ferroelectric Perovskites
15:15 - 15:30	Payal Wadhwa	Machine learning-aided study of surface reconstructions of Cu ₂ O (111) plane
15:30 - 16:00:	Tea/Coffee	
Day 2:	<i>Session Chair: Swapan K Pati</i>	

Parallel Session-2		
16:00-16:30	Bahadur Singh	Spin U(1) quasi-symmetry and quantized spin Hall effect in puckered lattice materials
16:30 - 17:00	Mukul Kabir	Reversible Quantum Phases in Magnetic Topological Insulators
17:00-17:30	Souvik Paul	Trends in magnetic interactions of transition-metal trilayers under electric fields
17:30-19:00	Poster presentation/Scientific Discussions	
19.00 pm onwards:	Dinner	

Day 2: Parallel Session-3	<i>Session Chair: Kalpataru Pradhan</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Ramesh Chandra Nath	Field induced magnetic transition in the double trillium lattice antiferromagnet $\text{KBaCr}_2(\text{PO}_4)_3$
9:30 - 10:00	Tulika Maitra	Emerging triferroicity and polar metallic state in two dimensional rare-earth halide based monolayers
10:00 - 10:15	Amit Vashist	Magnetic phase transitions in an antiferromagnetic topological insulator probed by nanomechanical resonators
10:15 - 10:30	Suraj S. Hegde	Emergent topology and its signatures in dissipative dynamics of topological condensed matter.
10:30 -11:00:	Tea/Coffee	
Day 2: Parallel Session-3	<i>Session Chair: Sumilan Banerjee</i>	
11:00 - 11:30	Sudhansu S Mandal	Solution of a Spin-1/2 Trimer Chain and Experimentally Verifiable Quantities
11:30 - 12:00	V Ravi Chandra	Spin wave interactions in the pyrochlore Heisenberg model with Dzyaloshinskii-Moriya terms
12:00 - 12:15	Biplab Pal	Engineering flux-controlled flat bands and topological states in a Stagome lattice

12:15 - 12:30	Kuldeep Suthar	Non-Hermitian Many-Body Localization and Skin Effect
12:30 - 14:00:	Lunch	
Day 2: Parallel Session-3	<i>Session Chair: Sudeep Kumar Ghosh</i>	
14:00 - 14:30	Kush Saha	Frequency-selective amplification of nonlinear response in strongly correlated bosons
14:30 -15:00	Auditya Sharma	Interplay of external drive and long-range hopping in the PLRBM model.
15:00 -15:15	Deepak Gaur	Non-Equilibrium Dynamics of Ultracold Bosonic Gases: Insights from Cluster Mean Field Theory
15:15 -15:30	Naba Prakash Nayak	Weak topological insulator phase in two-dimensional chiral symmetry class and universality of Anderson transition in chiral class
15:30 - 16:00:	Tea/Coffee	
Day 2: Parallel Session-3	<i>Session Chair: Kush Saha</i>	
16:00-16:30	Rejish Nath	Commensurate supersolids and re-entrant transitions in an extended Bose-Hubbard ladder
16:30 - 17:00	Sreejith Ganesh Jaya	Full distribution of local observables in an exactly solvable current carrying steady state of a driven XXZ chain
17:00- 17:15	Mainak Pal	Scar-induced imbalance and anomalous mid-spectrum zero modes in Rydberg ladders with staggered detuning
17:15- 17:30	Rajat Sharma	Temperature-induced supersolidity in spin-orbit-coupled Bose gases
17:30-19:00	Poster presentation/Scientific Discussions	
19.00 pm onwards:	Dinner	

Day 3, 23/12/24 (Monday):

Day 3: Parallel Session-1	<i>Session Chair: Sreejith Ganesh Jaya</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Nayana Shah	Systematically compactifying the two-channel Kondo model: fermions to bosons and back in a consistent way
9:30 - 10:00	Awadhesh Narayan	Non-Linear Hall Effect in Flatlands and Chiral Crystals
10:00 - 10:30	Arti Garg	Trade-off relations between quantum coherence and measure of many-body localization
10:30 - 10:45	Koushik Dey	Negative Capacitance for Stabilizing the Logic State in a Tunnel Field-Effect Transistor
10:45 -11:00:	Tea/Coffee	
Day 3: Parallel Session-1	<i>Session Chair: Amrita Bhattacharya</i>	
11:00 - 11:30	Nitेश Kumar	Gonipolarity in an Altermagnetic System
11:30 - 12:00	Thirupathaiah Setti	$\text{Sn}_{0.06}\text{Cr}_3\text{Te}_4$: A Skyrmion Superconductor
12:00 - 12:15	Nayana Devaraj	Interplay of altermagnetism and pressure in hexagonal and orthorhombic MnTe
12:15 - 12:30	Krishnendu Patra	Exploring the spin resolved fermi surface in an altermagnet- case of CrSb
12:30 - 12:45	Sourav Karan	Robust and Thermally Stable Pinning Mechanisms Behind the High J_c State of HTSC-TMC NPs Nanocomposites
12:45-13:00	Vinod Ashokan	Many body correlation effects in electron-electron quantum bi-wire systems
13:00 - 14:00:	Lunch Break	
Day 3: Parallel Session-1	<i>Session Chair: Nayana Shah</i>	
14:00 - 14:30	Akshay Singh	Dynamics of Moire Excitons and Quantifying Interfaces in 2D Heterostructure
14:30 -15:00	Amitava Bhattacharyya	Understanding Time-Reversal Symmetry Breaking and Exotic Pairing Mechanisms

15:00 -15:30	<i>Arnab das</i>	Unprotected Emergent Conservation Laws in Interacting Quantum Matter
15:30-15:45	Simrandeep Kaur	Controlling the Particle-hole symmetry in fractional Quantum Hall state in ABA trilayer graphene.
15:45-16:15	Tapan Mishra	Signatures of non-trivial doublon formation using a quantum computer
16:15-16:30	Tea/Coffee	
16:30-17:00	Concluding Ceremony	
19.00 pm onwards:	Dinner	

Day 3: Parallel Session-2	<i>Session Chair: Angom Dilip Kumar Singh</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Arko Roy	From magnetism to cosmology: Exploring Collective Behavior in Coherently coupled condensates
9:30 - 10:00	Ayan Khan	Liquids and Solids in Ultracold Atomic Gases
10:00 - 10:15	Swarup Kanti Sarkar	Interaction-induced spin-dependent localization of spin-1/2 Bose-Einstein condensates in a random disorder potential
10:15 - 10:30	Sonali Gangwar	Structure and dynamics of imbalanced quantum droplet in spin-orbit coupled Bose-Einstein condensates
10:30-10:45	Saisab Bhowmik	Magnetism, Fermi surface reconstructions, and Chern insulators in twisted bilayer graphene
10:45 -11:00:	Tea/Coffee	
Day 3: Parallel Session-2	<i>Session Chair: Akshay Singh</i>	
11:00 - 11:30	Pratap Raychaudhuri	Superconductivity in tungsten
11:30 - 12:00	Srijani Mallik	Exploring Rashba parameter and superconductivity in anisotropic KTaO_3 based two-dimensional electron gases
12:00 - 12:30	Satyabrata Patnaik	Experimental Manifestations of Topological

		Superconductivity
12:30-13:00	Navaneetha Krishnan Ravichandran	Data-driven discovery of unconventional heat flow regimes in common semiconductors
13:00 - 14:00	Lunch	
Day 3: Parallel Session-2	<i>Session Chair: Awadhesh Narayan</i>	
14:00 - 14:30	Sebabrata Mukherjee	Ultrafast Laser-inscribed Photonic Topological Materials
14:30 -15:00	Ashish Arora	Novel high-performance differential magneto-spectroscopy techniques: results and challenges
15:00 -15:30	Sudipto Chakrabarti	The interplay between magnetism and chemical binding
15:30-15:45	Debadrita Ghosh	Determining entanglement in spatial photonic qutrit pair generated via pump beam modulation technique.
15:45-16:00	Surajit Dutta	Visualizing isospin magnetic texture in rhombohedral tetralayer graphene
16:00-16:15	Aditi Chakrabarty	Absence of Wannier-Stark localization and skin effect in driven non-Hermitian systems
16:15-16:30	Tea/Coffee	
16:30-17:00	Concluding Ceremony	
19.00 onwards:	Dinner	

Day 3: Parallel Session-3	<i>Session Chair: Nitesh Kumar</i>	
Time	Speaker	Title of the talk
7:30-9:00	Breakfast	
9:00 - 9:30	Surajit Saha	Tuning the robust magnetic properties in MPS_3 ($M= Mn, Fe, and Ni$)
9:30 - 10:00	Atikur Rahman	Effect of Defects and Strain on the Optoelectronic Properties of Monolayer TMDs
10:00 - 10:30	Ratnadwip Singha	TBA
10:30-10:45	Shaili Sett	Impact of antiferroelectric moiré domains

		on a graphene field-effect transistor
10:45 -11:00:	Tea/Coffee	
Day 3: Parallel Session-3	<i>Session Chair:</i> Ramesh Chandra Nath	
11:00 - 11:30	Udit Khanna	Quantum Hall Phase Diagram in Bilayer Graphene
11:30 - 12:00	Subhra Sen Gupta	Chaos and Eigenstate Multifractality in Disordered Quantum Spin Systems and some Special Random Matrix Models
12:00 - 12:30	Bivas Dutta	1/2-quanta Thermal Conductance of an Isolated Quantum Hall Channel
12:30 - 12:45	Tuhin Maji	Interface Engineering of Ag@Au Nanohybrid for Ultra-strong Electron-phonon Coupling and Non-classical Electron Transport
12:45-13:00	Zainab Chowdhry	Investigation of magnetism in 2D material MoS ₂
13:00 - 14:00:	Lunch	
Day 3: Parallel Session-1	<i>Session Chair:</i> Thirupathaiah Setti	
14:00 - 14:30	Pavan Nukala	Emergent functions via proximity coupling of Mott insulators with ferroelectrics
14:30 -15:00	Jhuma Sannigrahi	Unraveling the Magnetoelectric Coupling in CaMn ₇ O ₁₂
15:00 -15:30	Binoy K. Hazra	Unconventional spin Hall effect in non-collinear antiferromagnet
15:30-15:45	Shalini Verma	Investigation of Structural, Magnetic, and Dielectric Behavior in Nd-Doped Gd ₃ Fe ₅ O ₁₂ multiferroic samples
15:45-16:00	Akriti Singh	Investigating temperature-induced structural phase transition in Double Perovskite oxides
16:00-16:15	Jagannath Sutradhar	Singlet, triplet, and mixed all-to-all pairing states emerging from incoherent fermions
16:15-16:30	Tea/Coffee	
16:30-17:00	Concluding Ceremony	
19:00 onwards	Dinner	

