

ICTS Seminar

- Title** : Terahertz probes for quasiparticle electrodynamics in complex oxides
- Speaker** : Dhanvir Singh Rana (IISER, Bhopal)
- Date** : Tuesday, 28th September 2021
- Time** : 03:00 pm (IST)
- Abstract** : The implementation of terahertz (THz) spectroscopy to unravel the complexity of correlated materials has delivered unprecedented success. Some of the achievements include demonstration of Trimerons, Higg's mode, magnetic monopole, electromagnons, charge-density waves (CDW), Dirac and Weyl fermions, etc, in complex systems. In this talk, I'll present the efficacy of time-averaged and time-resolved THz spectroscopy in resolving some outstanding issues in rare-earth nickelates dominated by correlations and SrIrO₃ iridate incorporating the potential of spin-orbit coupling. In the former, a CDW type ground state, Fermi to non-Fermi liquid crossover, Planckian dissipation, etc, were unveiled via THz response of microscopic quantities such as scattering rate, plasma frequency, spectral weight, and effective mass. In SrIrO₃, a rare non-symmorphic crystalline symmetry protected nodal-line phase enabled by structural symmetry modification in thin film heterostructures was demonstrated via spatial dependence of THz spectra of low-energy quasiparticles dynamics. High mobility Dirac electrons with Fermi-liquid behaviour and diversity in non-Dirac type carriers' dynamics induced by orientation and symmetry of epitaxial thin films construct this nodal-line topological phase. These two examples underpin THz spectroscopy as indispensable tool for probing a variety of quasiparticles emerging from electrodynamics of collective, bound and free charge carriers, complex spin orders, etc, in new era of quantum matter.
- Ref:** 1. D. S. Rana and M. Tonouchi, Adv. Opt. Mater. 8, 1900892 (2020)
2. K. Santhosh Kumar et al, Adv. Opt. Mater. 8, 1900958 (2020)
- Venue** : Please click on the below link to join the seminar
- <https://us06web.zoom.us/j/81495050085?pwd=VVF4cnh4WFBScond6eE8vbnlpeXZmdz09>
Meeting ID: 814 9505 0085
Passcode: 300036