



**S N BOSE NATIONAL CENTRE
FOR BASIC SCIENCES**

Block JD, Sector III, Salt Lake, Kolkata 700 106

DEPARTMENTAL SEMINAR

Condensed Matter Physics and Material Sciences

23rd March'2022

4.00 PM

ONLINE

SPEAKER



Dr. Kamaraju Natarajan

Associate Professor, Department of Physical Sciences, IISER Kolkata

Short Bio:

N. Kamaraju received his PhD degree in March 2011 on ultrafast experimental condensed matter physics from Department of Physics, IISc Bangalore. After his Ph.D, he worked in the field of terahertz physics in Fritz-Haber-Institut der Max-Planck-Gesellschaft, Berlin (for two years), and Department of Electrical and Computer Science Engineering, RPI, Troy, NY, USA (for one year). Later he did his final postdoctoral research in Los Alamos National labs, NM, USA on using THz to study two dimensional systems under high magnetic fields. He is now an associate professor in Dept of Physical Sciences, Indian Institute of Science Education and Research Kolkata, India.

TITLE OF THE TALK

**CONDENSED MATTER SYSTEMS PROBED THROUGH FEMTOSECOND
SPECTROSCOPY AND THZ SPECTROSCOPY**

ABSTRACT

Ultrashort pulses with pulse widths of ~ 50 femtosecond pulses of electromagnetic radiation offer multitude ways to maneuver and also probe the elementary and quasi particle excitations of condensed matter systems. Understanding of the underlying physics upon excitation of femtosecond pulses on a semiconductor for example still is very much important in the development of photonics and spintronics as alternatives to traditional electronics, crossing the boundaries of physics, materials science, and electrical engineering. Here in the talk, I will present some of the recent results from our laboratory demonstrating this capability to understand the effect of carrier density on the electron-phonon coupling in wide band gap semiconductor nanoparticles and single crystals of topological insulator systems using ultrafast spectroscopy. In the second part of the talk, I will also introduce THz spectroscopy as a probe for condensed matter physics and also some ways to control the THz pulses through optical means.

HOST FACULTY

Dr. Thirupathaiah Setti

Assistant Professor & Seminar Coordinator, CONDENSED MATTER PHYSICS AND MATERIAL SCIENCES
