Seminar, Department of Physical Sciences, Bose Institute, Kolkata

Contact Geometry and Thermodynamics

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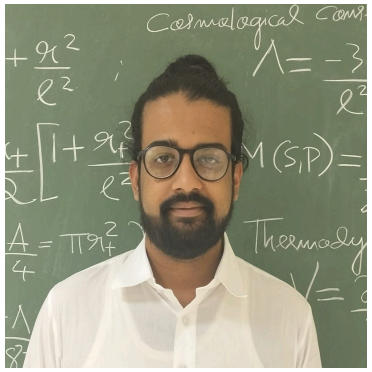

Abstract: In this talk, I will discuss some aspects of contact geometry, with particular emphasis on thermodynamics. I will begin with a short introduction to contact geometry, briefly pointing out its relevance to dissipative mechanics. Thermodynamic phase spaces assume the structure of a contact manifold, with the points describing equilibrium states being restricted to certain submanifolds of this phase space. I will discuss gauge transformations and Legendre transforms, and shall also describe thermodynamic processes using contact Hamiltonian dynamics and the contact Hamilton-Jacobi equation, both of which are compatible with each other. Following this, I will describe the emergence of interacting thermodynamic systems from non-interacting ones via deformations induced by contact Hamiltonian vector fields. I will end with some discussion on the notion of metric structures (in the sense of Sasaki), putting emphasis on Hessian metrics and ensemble non-equivalence.

Date/time: August 07, 2024 (Wednesday) at 12:00 noon

Venue: Physics Seminar Room (204, second floor, UAC, BI)