



## **ICTS Astrophysics & Relativity Seminar (HYBRID)**

**Title** : Unraveling the Secrets of Particle Acceleration in Collisionless Shocks

**Speaker** : Siddhartha Gupta (Princeton University)

**Date** : Tuesday, 30<sup>th</sup> January 2024

**Time** : 03:30 PM (IST)

**Abstract** : Collisionless shocks produce nonthermal particles (cosmic rays) in most space/astrophysical environments, as well as in laboratory experiments. While the main acceleration mechanism for these particles is known as "diffusive shock acceleration", the processes that inject electrons into diffusive shock acceleration are still not fully understood. In this talk, I will discuss our recent efforts to solve this problem using first-principles kinetic plasma simulations of non-relativistic shocks. I will emphasize the critical role played by self-generated plasma instabilities in both the injection and enhancement of the energy of nonthermal particles. Finally, I will present a toy model to demonstrate the results of our simulations. This study is crucial for formulating subgrid recipes for nonthermal processes at shocks and for understanding the phenomenology of nonthermal radio, X-ray, and gamma-ray emission across the universe.

**Venue** : **Offline:** Emmy Noether Seminar Room (ICTS)

**Online:** Please click on the below link to join the seminar

<https://icts-res-in.zoom.us/j/96364906445?pwd=b2ZySkpWZE0rdmJBaFhLUkMrWGVtZz09>

Meeting ID: 963 6490 6445

Passcode: 303031