

Plasma Physics Seminar

Physics & Astronomy Building (PAB) Room 4-330

Via Zoom: <https://ucla.zoom.us/j/92785449357?pwd=SVBTSko3bTdEUW03dzQwNks1Q2lKZz09>

Friday, May 26, 2023

11:30 AM Lunch will be served

Energy Partition In Collisionless Shocks: A Microphysical Perspective

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Abstract: Astrophysical shock waves are among the most powerful particle accelerators in the Universe. Generated by violent interactions of supersonic plasma flows with the interstellar or intergalactic medium, shocks are inferred to heat the plasma, amplify magnetic fields, and accelerate electrons and protons to highly relativistic speeds. However, the exact mechanisms that control energy partition in shocks remain a mystery. This is particularly challenging for high Mach number shocks, such as those associated with supernova remnants, where spacecraft data in the relevant regime is scarce and the shock structure cannot be directly resolved from observations. I will review recent progress in using the combination of fully kinetic simulations and laser-driven laboratory experiments to study energy partition in high-Mach number collisionless shocks.

In particular, I will present results on magnetic field amplification, plasma heating and particle acceleration, and discuss how experimental measurements are helping benchmark models of the shock microphysics.