

SHOCKS UNDER THE MICROSCOPE

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Shock waves are ubiquitous, occurring in our magnetosphere, near explosions and supersonic aircraft, and around meteors, and they could potentially be used to generate endless supplies of fusion energy and to treat cancer. Beyond these real-world examples, shock waves are also of interest as a system that simultaneously displays extreme equilibrium and non-equilibrium properties, defying easy theoretical treatments. I will briefly discuss the usual hydrodynamic description of shock waves using a Navier-Stokes hydrodynamics approach before building a hydrodynamics model from an atomistic point of view. This latter approach reveals how and why hydrodynamics descriptions might fail. Finally, I will describe detailed molecular dynamics simulations of shock waves that reveal the underlying physical processes at the atomic level, including kinetic effects beyond the scope of the usual hydrodynamic description.

Friday, December 2, 2016 - 3:10 p.m.

Franklin Miller, Jr. Lecture Hall (RBH 109)

Reception to follow.

Physics Department - Colloquium Series - Fall 2016