

Weekly Seminar: Spring 2010

Date: Friday April 16

Time: 11:00 AM

Location: Maryland Hall 110

Speaker: Prof. H.S. Udaykumar (University of Iowa)

Title: *"A General Framework for Simulation of High-speed Multimaterial Flows"*

Abstract

High-speed multimaterial interactions can occur in a wide range of applications including meteorite impact, bubble collapse in cavitation, munition impact and penetration into targets, high-speed materials processing such as laser processing, abrasion etc. These are phenomena that occur at the microscale all the way to geological and even astronomical scales. The basic unifying feature is that there are strong shock waves in these systems that interact with material interfaces that can deform in extreme ways. This talk will describe a computational approach for the solution of such phenomena. The framework allows for handling of arbitrary material pairs (fluid-fluid, fluid-solid and solid-solid) and is based on Eulerian conservation law solutions and levelset formulation for interfacial dynamics. Test problems for each situation will be shown along with systematic validation to place the techniques on a sound footing.