Computations of Multimaterial Flows in Compressible and Incompressible Flows

H. S. Udaykumar
Associate Professor
Department of Mechanical and Industrial Engineering
The University of Iowa

Supported by AFRL-MNAC, AFOSR Computational Mathematics Program, NSF, NIH
Particle-laden Flows

Settling of particles in fluids
Adaptively refined mesh
Droplets and Bubbles

Interaction of a droplet with a solid surface, including the mechanics of contact lines

\[ \text{Re} = 3333 \]
\[ \text{We} = 50 \]
\[ \theta_{\text{advancing}} = 110^0 \]
\[ \theta_{\text{receding}} = 60^0 \]

Deformation of a bubble following interaction with a shock wave
Impact, penetration and collapse

Shapes of a tungsten rod penetrating a steel plate with an impact velocity of 1250 m/s.

(a) 20 μs  b) 40 μs  c) 60 μs  d) 80 μs

Evolution of void collapse process in HMX for a 5 micron radius void, elasto-viscoelastic material.