Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Equations and simulations for multiphase compressible gas-dust flows[1] ELAINE ORAN, RYAN HOUIM, University of Maryland — Dust-gas multiphase flows are important in physical scenarios such as dust explosions in coal mines, asteroid impact disturbing lunar regolith, and soft aircraft landings dispersing desert or beach sand. In these cases, the gas flow regime can range from highly subsonic and nearly incompressible to supersonic and shock-laden flow, the grain packing can range from fully packed to completely dispersed, and both the gas and the dust can range from chemically inert to highly exothermic. To cover the necessary parameter range in a single model, we solve coupled sets of Navier-Stokes equations describing the background gas and the dust. As an example, a reactive-dust explosion that results in a type of shock-flame complex is described and discussed.

[1]Sponsored by the University of Maryland through Minta Martin Endowment Funds in the Department of Aerospace Engineering, and through the Glenn L. Martin Institute Chaired Professorship at the A. James Clark School of Engineering.

Elaine Oran
University of Maryland

Date submitted: 26 Jul 2014 Electronic form version 1.4