Extensions of the Multi-material DEM Model David E. Stevens^1 ^1 Lawrence Livermore National Laboratory 8000 East Avenue, L-98 Livermore, California, 94551

The proper representation of multiphase phenomena is important for the simulation of many non-ideal flows. The Discrete Equation Method (DEM) of Chinnayya et al builds up a complete multiphase solution by summing up a series of single-phase contact problems between phases. This allows the usage of extremely accurate single-phase Riemann solvers and the incorporation of additional effects such as granular stresses. Thus, a multiphase solution with the accuracy of the underlying single-phase solver can be utilized.

This presentation will discuss extensions of the DEM method beyond just simple particle-gas problems. The extensions of interest are flows with deviatoric stresses, such as granular effects, three-phase flows with solid obstacles in addition to particulate, and the incorporation of advanced interface reconstruction techniques. This last topic is of interest in that DEM has multi-material capabilities beyond just particle-laden flows.

References:

Chinnayya, A., Daniel, E., and Saurel, R., Modeling detonation waves in heterogeneous energetic media, J. Comput. Phys, 196, 490-538, 2004.