Abstract Submitted
for the DFD06 Meeting of
The American Physical Society

The breakup of a round liquid jet by a coaxial flow of gas using the Refined Level Set Grid Method[1] DOKYUN KIM, MARCUS HERRMANN, PARVIZ MOIN, Stanford University — Numerical simulations are conducted to investigate the break-up and atomization of a round liquid jet surrounded by a coaxial flow of gas. A Refined Level Set Grid (RLSG) method coupled to a Lagrangian spray model is used to capture the whole breakup process of the liquid jet. In the near field of the liquid jet, where the primary breakup occurs, motion and topological changes of the liquid jet are described by the RLSG method. In this region, a liquid jet consists of the core and ligaments, which subsequently break into various sizes of drops. The drops generated by the primary breakup are transferred to a Lagrangian stochastic spray model in order to describe the secondary breakup process. The characteristics of the primary breakup in the near-field and statistical properties of the resulting spray are examined for different subgrid scale RLSG primary breakup models. These numerical results demonstrate the applicability and feasibility of our method for simulation of the atomization process of liquid jets in turbulent flows.

[1]Supported by Stanford DOE ASC program

Dokyun Kim
Mechanical Engineering, Stanford University

Date submitted: 14 Aug 2006 Electronic form version 1.4