Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Bag Breakup of Viscous Drops VARUN KULKARNI, School of Mechanical Engineering, Purdue University, DANIEL GUILDENBECHER, Sandia National Laboratories, STEPHANIE FIREHAMMER, School of Aeronautics and Astronautics, Purdue University, PAUL SOJKA, School of Mechanical Engineering, Purdue University — Secondary breakup of drops has been of interest since the early 1900s. The present work focuses on the drop fragmentation process in the presence of a continuous gas - jet at *We* corresponding to the bag breakup regime. Its purpose is to extend current understanding of inviscid drops to the viscous case through a combination of theoretical and experimental efforts. Various aspects of the physical process, such as regime boundaries, drop fragment sizes, and initiation time, which have been hitherto mostly empirical, are studied. The theoretical formulations are based on conservation equations and hydrodynamic linear stability analysis. Techniques which involve extensive testing using PDA and high speed imaging are employed to compare model predictions with experimental data. The breakup event, as visualized through the bag expansion extent is seen to occur at a slower rate than its inviscid counterpart and is captured adequately by theory. This revealed the reasons for *Oh* dependence. Also seen is the emergence of a bimodal droplet size distribution corresponding to the rim and bag fragments. Finally, the extent of bimodality was seen to be dependent on *Oh*.

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Date submitted: 02 Aug 2012 Electronic form version 1.4