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W Bo* (bowrg@ams.sunysb.edu), Dept. of Applied Mathematics and Statistics, Stony Brook, NY 11790, and **W Glimm** and **X Li**. *Numerical Study of Jet Spray Formation in Diesel Injectors*. Preliminary report.

We present a numerical study of the 3-D jet spray formation in a diesel injector by the Front Tracking method. We simulate both the flow inside the nozzle and the jet outside. The shape of the nozzle comes from a real asymmetric diesel injector. Inside the nozzle, high speed flow generates cavitation bubbles which are modeled with dynamic bubble insertion. Since the diameters of the cavitation bubbles are much smaller than the diameter of the nozzle, the problem is multiscale. We simulate the problem with relatively fine grid and thousands of processors. We also study the jet sheet outside the nozzle. The mechanism of breakup of a jet is the key to design a fuel efficient diesel injector. We find cavitation bubbles play a great role in jet breakup. (Received December 10, 2007)