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Detailed Numerical Simulations of the Primary Atomization of a Turbulent Liquid Jet[1] MARCUS HERRMANN, Arizona State University — The atomization process of turbulent liquid jets is as of this day not well understood. Detailed numerical simulations can help study the fundamental mechanisms in regions, where experimental access and analysis is virtually impossible. However, simulating atomization accurately is a huge numerical challenge since time and length scales vary over several orders of magnitude, the phase interface is a material discontinuity, and surface tension forces are singular. The Refined Level Set Grid (RLSG) method is one numerical approach to simulate the primary breakup process of liquid jets and sheets in detail. We will present simulation results of the primary atomization of a Reynolds number 5000 round turbulent liquid jet injected into stagnant high pressure air using the RLSG approach. The physical mechanisms resulting in the initial breakup of the jet will be discussed. Drop size distributions resulting from primary atomization will be presented and their dependence/ independence on the employed numerical grid resolution will be discussed.

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