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Breakup at the resolution limit MARCUS HERRMANN, Arizona State University — The process of atomization is characterized by a vast range of time and length scales present in the flow. In fact, when the topological change of the phase interface occurs, i.e. a liquid structure breaks into smaller structures, the length scale goes to zero. Thus simulations of atomization are not able to resolve all length and time scales at all times. Typically, simulations are under-resolved during the final stages of breakup, relying on the properties of the numerical methods used, i.e., the properties of the methods' inherent numerical errors, to capture the topology change events correctly. This reliance on numerical errors to reproduce physical processes is questionable, but unavoidable without dedicated, breakup models that do not rely on the local mesh resolution to initiate breakup. In this talk, we will discuss how different interface capturing techniques perform during the final stages of breakup, using the breakup of a ligament in a test bed as an example. The results can give insights into the drop size distributions obtained in detailed simulations of atomizers, especially concerning smaller drop sizes near the mesh resolution limit.

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