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Simulation and Modeling of Droplet Collisions using a Film-Capturing VOF Method ROBERT CHIODI, OLIVIER DESJARDINS, Cornell University — Due to the presence of the liquid-gas interface and corresponding discontinuities in physical properties, simulating multiphase flows can be difficult. Furthermore, interface instabilities and their interaction with the surrounding flow field can occur over a range of temporal and spatial scales spanning multiple orders of magnitude. Even with improvements in computing power, it is not possible to directly resolve all relevant scales in the flow and sub-grid scale models are needed to enable the simulation of realistic multiphase systems. In this talk, we discuss the modeling of droplet coalescence and rebound during droplet collisions. These models are developed in the context of a novel interface reconstruction algorithm for geometric volume of fluid methods, R2P, which is capable of capturing sub-grid scale fluid films. First, we implement existing droplet collision models for use with R2P and compare their results to experiments. We then go on to discuss opportunities for physics-based modeling informed by resolved flow-features and film-metrics extracted from the R2P interface reconstruction.

Robert Chiodi
Cornell University

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