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Numerical simulation of drop impact on a thin film: the origin of the droplets in the splashing regime[1] ZHIHUA XIE, ZHIZHAO CHE, RENAD ISMAIL, CHRIS PAIN, OMAR MATAR, Imperial College London — Drop impact on a liquid layer is a feature of numerous multiphase flow problems, and has been the subject of numerous theoretical, experimental and numerical investigations. In the splashing regime, however, little attention has been focused on the origin of the droplets that are formed during the splashing process. The objective of this study is to investigate this issue numerically in order to improve our understanding of the mechanisms underlying splashing as a function of the relevant system parameters. In contrast to the conventional two-phase flow approach, commonly used to simulate splashing, here, a three-dimensional, three-phase flow model, with adaptive, unstructured meshing, is employed to study the liquid (droplet) gas (surrounding air) liquid (thin film) system. In the cases to be presented, both liquid phases have the same fluid property, although, clearly, our method can be used in the more general case of two different liquids. Numerical results of droplet impact on a thin film are analysed to determine whether the origin of the droplets following impact corresponds to the mother drop, or the thin film, or both.

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