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Numerical Simulations of Drop Impact on Surfactant-Laden Interfaces[1] RICHARD CRASTER, ASSEN BATCHVAROV, LYES KAHOUADJI, CRISTIAN CONSTANTE-AMORES, OMAR MATAR, Imperial College London — The impact of drops on solid and fluid substrates is accompanied by rich phenomena that have been the source of fascination for decades. Recent experimental work (Che and Matar, Langmuir, 33, 43, 12140-12148, 2017) has investigated the effect of surfactants on the phenomenon of "crown" splashing and found that they affect significantly the propagation of capillary waves, the evolution of the crown, and the formation of secondary droplets. In this work, we employ three-dimensional direct numerical simulations to examine drop impacts on thin films in the presence of surfactants. We use a hybrid interface-tracking/level-set method for the interfacial dynamics coupled to a convective-diffusion equation for the surfactant concentration to carry out the computations. We vary different surfactant properties (i.e. diffusion, elasticity, and solubility) to study their effect on the phenomena accompanying the drop impact.

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