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Probing surfactant dynamics in a sheared foam through level-set simulations YEDHIR MEZACHE, MARIE LE MERRER, FRANOIS DETCHEVERRY, ANNE-LAURE BIANCE, Institut Lumire Matire, Univ Lyon I UA 442 CNRS, PETER SPELT, Laboratoire de Mcanique des Fluides et d'Acoustique, Univ Lyon I UA 442 CNRS — A liquid foam is a dispersion of gas bubbles in a soapy liquid matrix, routinely used in various applications for its large specific area, light weight, and insulating properties. We investigate its flow behavior, which strongly depends on the properties of the surfactants used to generate it. This is done by imposing a shear flow in the foam at the bubble scale, wherein the bubbles undergo T1 transformations, and the evolution of the surfactant distribution is followed during this process. To follow the surfactant dynamics, experimentally inaccessible, and its coupling to the flow, we simulate T1 events numerically, using a two-phase flow level-set method that has been adapted to include the surfactant transport (Titta et al., Journal of Fluid Mechanics, 2018). We perform a parametric study of this system by varying the dimensionless numbers for the surfactant dynamics, including the Biot and Pclet numbers, and the adsorption depth, and identify dissipation sources inside the sheared foam.

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