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Waves on an interface with surfactant WILLEM VAN DE WATER, Laboratory for Aero and Hydrodynamics, Delft University of Technology, YUKMAN LAU, JERRY WESTERWEEL, Laboratory for Aero and Hydrodynamics Delft University of Technology, DAMIR JURIC, JALEL CHERGUI, Laboratoire dInformatique pour la Mcanique et les Sciences de lIngnieur (LIMSI), Centre National de la Recherche Scientifique (CNRS), SEUNGWON SHIN, Department of Mechanical and System Design Engineering, Hongik University, Korea — The presence of surfactant on an interface between two immiscible fluids can dramatically change the interfacial tension. The question is whether this is still so when the interface is rippled through waves which redistribute surfactants. We study Faraday waves on an oil-water interface and use benchmark surfactants with increasing concentration that reaches into the realm of ultralow interfacial tension ($\sigma = \mathcal{O}(10^{-6}$ N/m)). In the experiments we measure the wavelength, wave height and threshold acceleration amplitude and compare them to a Floquet analysis [1]. Surprisingly, the dispersion of capillary waves (frequency 20 Hz) points to a much stiffer interface at surfactant concentrations where it should be ultralow. We hypothesize the key role of surfactant dynamics. This is supported by numerical simulations[2] of Faraday waves in the presence of surfactant gradients.

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2. S. Shina, J. Cherguib, D. Juricb, L.Kahouadjic, O. K. Matarc, and R. V. Crasterd, J. Comp. Phys., **359**, 409-435 (2018)

Willem van de Water
Laboratory for Aero and Hydrodynamics, Delft Univrsity of Technology

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