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Experimental and Theoretical Study of Chemically Driven Waves at an Oil-Water Interface MEIR BASSON, ROUSLAN KRECHETNIKOV, University of California at Santa Barbara — When an aqueous solution of TSAC surfactant is placed on top of a heavier organic solution of Iodine, a chemical reaction between the solutes causes traveling waves to form at the interface. These traveling waves have wavelengths on the order of centimeters and speeds on the order of centimeters per second. In this talk, we present an experimental study of these chemically driven interfacial waves that form and rotate around an annular container. Specifically, using stereo photography, we resolve the three dimensional structures and time scales of the waves and thus explore the effect of parameters such as container geometry (e.g. diameter, annular gap) and solute concentrations on the speed, shape, and lifetime of the formed interfacial waves. Also, a theoretical study describing the mechanism behind the traveling waves will be presented. In particular, we analyze the chemical reaction which causes the wave motion and propose a model for the chemical-to-mechanical conversion of energy at the liquid-liquid interface.

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