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**Fabrication of nano-emulsions by bursting bubble at a liquid-liquid interface** JIE FENG, MATTHIEU ROCHÉ, DANIELE VIGOLO, Department of Mechanical and Aerospace Engineering, Princeton University, Princeton NJ 08544, USA, LUBEN ARNAUDOV, SIMEON STOYANOV, Unilever Research & Development, 3133AT Vlaardingen, The Netherlands, HOWARD A. STONE, Department of Mechanical and Aerospace Engineering, Princeton University, Princeton NJ 08544, USA — Bubbles bursting at interfaces is a familiar everyday occurrence and plays a role in important processes of transport across interfaces. Here we demonstrate that the bursting of air bubbles at an air-oil-water interface in the presence of a surfactant and a co-surfactant leads to the dispersion of nano-droplets in water. Using high-speed imaging we investigate the mechanism for the dispersion of objects and show that small droplets detach from the boundary of the bubble towards the bulk water during collapse of the bubble. We also characterize the size and stability of the dispersed objects with dynamic light scattering and microscopy techniques. The observations indicate that a well-defined population of few-hundred-nm-sized droplets is produced by bubble bursting, along with a broad range of sizes above 1 $\mu$m. We propose that the dispersed objects are formed because of the rapid motion of the bubble interface during collapse. By varying experimental conditions, we show that the size of the droplets is influenced mainly by the amount of surfactant in the oil phase.

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