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Direct Numerical Simulations of the Three Dimensional Dynamics of Surfactant Laden Bursting Bubbles[1] DAMIR JURIC, LIMSI, CNRS, France, RICARDO CONSTANTE-AMORES, ASSEN BATCHVAROV, LYES KAHOUADJI, Imperial College London, SEUNGWON SHIN, Hongik University, South Korea, JALEL CHERGUI, LIMSI, CNRS, France, RICHARD CRASTER, OMAR MATAR, Imperial College London — Bursting bubbles play an important role in both industrial applications and nature with $\sim 10^{18}$-10^{20} bubble bursts per second over the oceans, exchanging chemical components or heat between the ocean and the atmosphere. When a bubble is close to a free surface, it forms a hole which leaves an open unstable cavity that will collapse; the change of the interface curvature leads to the formation of a central jet, which breaks into droplets according to the Plateau−Rayleigh instability. The surfactant-free interfacial dynamics are well understood but the surfactant-laden ones are not. Neglecting gravity, the Laplace number is the only remaining control parameter measuring the relative importance of surface tension to viscous forces i.e. $La = \rho\sigma R/\mu^2$, where ρ, μ, σ, and R are the liquid density, viscosity, surface tension, and the initial radius of the droplet, respectively. 3D DNS simulations varying the Peclet number, $Pe = UR/D$, where U and D denote the velocity and diffusion coefficient, respectively, were performed to analyse the fate of the jet. Results regarding the interfacial surfactant concentration distribution, the surface tension gradients, and the importance of Marangoni stresses on the jet formation will be presented.

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