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Muhammad I Hameed* (hameed@uscupstate.edu), 800 University Way, Spartanburg, SC
29303. *Long-wave asymptotic models for liquid thread breakup.*

Breakup of a periodic fluid thread of low viscosity is investigated which is immersed in a highly viscous exterior fluid at low Reynolds number. With an aim to better understand the pinch-off dynamics, we use long-wave asymptotic, numerical simulations and experimental data to investigate the effect of surfactant on the evolution, necking and eventual breakup. Partial differential equations for the jet interface and surfactant concentration are derived using long wavelength approximations. These one dimensional evolution equations are solved numerically for given initial interface and surfactant concentration. It is found that the presence of surfactant at the interface retards the pinch-off process. The influence of various physical effects on the breakup process is also investigated. The influence of surface diffusion of surfactant on the thread deformation is studied by varying surface Peclet number with interesting results (Received September 15, 2021)