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Surfactant Spreading on Thin Viscous Fluid Films[1] CAITLYN
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LEVY, Harvey Mudd College — We examine the spreading of insoluble lipids on a
viscous Newtonian thin fluid film. This spreading can be modeled as two coupled
nonlinear fourth-order partial differential equations, though inconsistencies between
the timescale of experiments and simulations have been reported in recent research.
In simulations, we replace traditional models for the equation of state relating surfactant concentration to surface tension with an empirical equation of state. Isotherms
collected via a Langmuir-Pockels scale provide data for the equation of state. We
compare the timescale of simulation results to measurements of the fluorescently
tagged lipid (NBD-PC) spreading as well as the height profile, captured with laser
profilometry.

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