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Inertial Lubrication Theory MEDERIC ARGENTINA, NICOLAS ROJAS, University Nice Sophia Anitpolis, ENRIQUE CERDA, Universidad Santiago de Chile, ENRIQUE TIRAPEGUI, Universidad de Chile — Thin fluid films can have surprising behavior depending on the boundary conditions enforced, the energy input and the specific Reynolds number of the fluid motion. Here we study the equations of motion for a thin fluid film with a free boundary and its other interface in contact with a solid wall. Although shear dissipation increases for thinner layers and the motion can generally be described in the limit as viscous, inertial modes can always be excited for a sufficiently high input of energy. We derive the minimal set of equations containing inertial effects in this strongly dissipative regime.

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