18.357: Lecture 18

Forced wetting, coating

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18.357: Lecture 19

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Oil on water

Waves

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Static drops at interfaces (Pujado & Scriven 1972)

Pendant Lenses: stable only for drops small relative to capillary length





$\rho_A < \rho_B < \rho_C$

 $\rho_C < \rho_A < \rho_B$

B

 $\rho_A < \rho_C < \rho_B$

e.g. oil on water

Oil on water: A brief review

 ρ_a

 ρ_w

when an oil drop is emplaced on the surface of water, its behaviour will depend on the spreading coefficient

$$S = \sigma_{aw} - \phi$$

■ for S < 0, an equilibrium configuration arises: the drop assumes the form of a sessile lens Statics: Langmuir (1933); Pujado & Scriven (1972)

Dynamics: Wilson & Williams (1997), Miksis & Vanden-Broeck (2001)

• for S > 0, the droplet will completely wet the underlying liquid, and so spread to a layer of molecular thickness



 $-\sigma_{ow}$ $\sigma_{_{oa}}$

Franklin (1760); Fay (1963); DePietro & Cox (1980); Foda & Cox (1980); Joanny (1987); Brochard-Wyart et al. (1996); Fraaije & Cazabat (1989)









Why does one only surf near the beach?





What relates the frequency to the wavelength?



Big splash





Small splash



