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Drainage of Emulsion and Foam Films in Scheludko–Exerowa Cells

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Thin liquid films are fundamental components in a variety of industrial processes including foam manufacturing and oil exploration. Improved understanding of the drainage is essential for accurate predictions of the stability and lifetime of a film. Numerous fundamental studies of thin films have been conducted in Scheludko–Exerowa cells, in which a biconcave foam or emulsion film is created by suspending a thin liquid film across a gas filled or liquid filled tube. Using optical probes, the film thickness can be measured as a function of time with high precision. In this paper, predictions of drainage times from the lubrication theory of Reynolds and the Manev–Tsekov–Radoev (MTR) theory are compared to experimental measurements obtained from numerous investigators. A semi-empirical equation consistent with MTR theory is described and is shown to be most consistent with a broad range of experimental data.

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