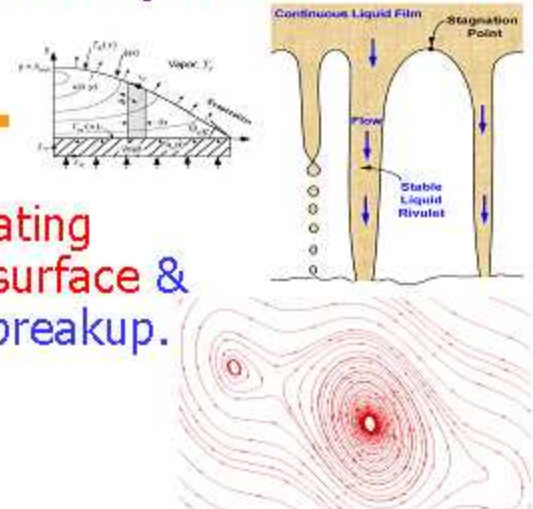


Velocity Fields in Stable Rivulets, Following Breakup of Liquid Films Flowing Down a Vertical, Uniformly Heated Wall

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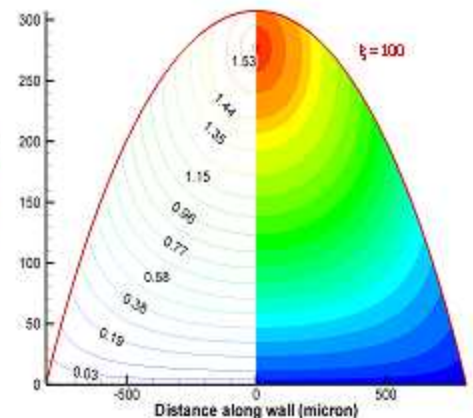


▣ Motivation:

Apply total energy minimization to breakup of evaporating liquid film flowing down on uniformly heated vertical surface & obtain velocity fields in a stable rivulet following film breakup.

▣ Contributions/Important Results:

- Obtained expressions for Δ_{\min} and Γ_{\min} as functions of θ_0 , evaporation rate/wall heat flux, Marangoni number, and liquid and vapor properties.
- Insignificant effect of θ_0 on Δ_{\min} and Γ_{\min} at high evaporation rates and of the wall at high conductance.
- Expressions for Δ_{\min} and Γ_{\min} compared favorably with reported data for water by Hsu et al. (1965) and Fujita and Ueda (1978).
- Thermocapillary induced micro-vortices ($\sim 10 \mu\text{m}$ in av. size) in stable rivulets forming at liquid film breakup, whose number and size increase with wall heat flux.



▣ Applications:

- Thin film HXs, distillation, thermosyphons, thin coating, and nuclear reactors