Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Linear stability of a liquid film on a slipping surface with nonuniform slip length ELIZAVETA GATAPOVA, Institute of Thermophysics, Novosibirsk (Russia), VLADIMIR AJAEV, Southern Methodist University, OLEG KABOV, Institute of Thermophysics, Novosibirsk (Russia) — We consider stability of a uniform liquid film on a structured surface. The effect of structuring is modeled by periodic spatial variations of slip length, motivated by a situation when gas-liquid or liquid-liquid menisci form between the elements of the structure. The film instability is driven by disjoining pressure which is modeled by body force terms in the Navier-Stokes equations. Previous investigations of this configuration were based on lubrication-type models, which fail when localized regions of rapid change in surface properties are present, e.g. near the lines of contact between fluid menisci and solid surface. We develop a linear stability theory which is free from the limitations of the lubrication-type approach. Destabilizing effect of the surface structuring is found. The results are compared with the case of uniformly slipping surface.

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Date submitted: 03 Aug 2012 Electronic form version 1.4