Abstract Submitted
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Localized running drops on a binary mixture thin film MICHAEL BESTEHORN, ION BORCIA, BTU Cottbus, Theoretical Physics II — We examine hydrodynamic instabilities occuring in a liquid binary mixture with a free and deformable surface. The derived reduced model is based on the long wave length (lubrication) approximation. It consists of a a set of two coupled equations, one for the surface profile $h(x, y, t)$, the other one for the concentration $n(x, y, t)$ on the surface:

$$\begin{aligned} \partial_t h &= -\nabla \left(\nabla h + \nabla \Delta h - \nabla (h^3) + \Psi \nabla n \right) \\ \partial_t n &= L(\Delta n - \Delta h) \end{aligned}$$

Here, Ψ is the separation ratio and L the Lewis number. Linear stability analysis as well as numerical solutions of the non-linear model equations in three spatial dimensions will be presented. The mechanism responsible for an oscillatory (Hopf) instability at onset of convection due to the Soret effect is examined. We show the formation of running drops or holes along the free surface, driven by a self-organized concentration gradient in lateral direction.

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