

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Oscillatory surface patterns in a heated thin film of a binary mixture¹ MICHAEL BESTEHORN, BTU Cottbus, Germany — We study a thin liquid film with a free surface on a uniformly heated substrate. The film consists of a mixture of two arbitrarily miscible fluids. The surface tension depends both on temperature and on relative concentration of the mixture. Using lubrication approximation, a systematic derivation of the extended thin film equation is performed. The resulting coupled system of two conservation equations (mean thickness and mean concentration) is discussed by a linear stability analysis of the flat film. It turns out that for a large region in parameter space oscillatory (Hopf) instabilities are obtained which are long-wave. Numerical solutions of the non-linear problem finally show a rich spatio-temporal behavior of the film's surface in form of traveling spots and holes or mazes having an intrinsic time dependence.

¹This work was partially funded by the DFG.

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Date submitted: 06 Jul 2010

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