DY 2: Invited Talk Martin Oettel

Time: Monday 9:30–10:00 Location: H18

Invited Talk DY 2.1 Mon 9:30 H18

Roughness growth modes in thin film growth — •Martin Oettel — Uni Tübingen, Institut für Angewandte Physik

Thin film growth is one of the fundamental nonequilibrium processes in statistical physics and it is also very relevant for applications. In the past years, experimental attention has shifted from the growth of metallic films (with fairly isotropic particles) to growth of organic films with possibly very anisotropic particles. In view of applications, the film morphology (notably the film roughness) is a central object of interest. To study that, we employ simple lattice models for isotropic and anisotropic particles to elucidate principal film growth modes with a focus on the intermediate thickness regime. For isotropic particles we find 4 principal growth modes with fairly sharp transitions between them [1]. E.g., a dynamic layering transition separates layer-by-layer and island growth and can be viewed as a nonequilibrium counterpart of wetting/layering transitions. Anisotropy in the interactions between the lattice particles does not change the roughness growth modes but adds further orientational transitions [2]. Further, we have studied monolayer growth for lattice particles which are also anisotropic in their hard-core shape. There, the deposition process corresponds to trajectories in the space of macroscopic order parameters (density, orientation) which connect rather small equilibrium domains and which describe generalized nucleation and arrest processes.

[1] E. Empting et al., Phys. Rev. E 103, 023302 (2021). [2] E. Empting, N. Bader, and M. Oettel, Phys. Rev. E 105, 045306 (2022).