1 Themen Masterseminar Sommersemester 2017

betreut durch Uwe Thiele (UT)[1]

1.1 Von Reaktions-Diffusions Systemen zu zellulären Automaten - Muster auf Eidechsenschuppen

From reaction-diffusion systems to cellular automata - patterns on lizard scales
Literatur: [1, 2], [3, chap. 4 of]

1.2 Klassische und Nichtklassische Nukleationstheorie

Classical and non-classical nucleation theory
Literatur: [4, 5, 6, 7, 8] and references therein

1.3 Getriebenes Frenkel-Kontorova Model

Driven Frenkel-Kontorova model
Literatur: [9, 10, 11] and references therein

1.4 Statische und dynamische Benetzungsübergänge

Static and dynamic wetting transitions
Literatur: [12, 13, 14, 15] and references therein

1.5 The Adler equation - a 'simple' model of stick-slip motion

Die Adler Gleichung - ein 'einfaches' Model von Haft-Rutsch-Bewegung
Literatur: [16, 17, 18, 19] and references therein

1.6 Störungstheorie für integrable Systeme - Stabilisierung eines Pendels durch Oszillationen/Rauschen

Perturbation theory for integrable systems - Stabilisation of pendulum through noise/oscillations
Literatur: [20, Kap. 6.1/6.2] and references therein

[1] u.thiele@uni-muenster.de

References

[1] A. Gierer and H. Meinhardt. A theory of biological pattern formation. *Kybernetik*, 12:30–39, 1972. doi:10.1007/bf00289234.

[2] Liana Manukyan, Sophie A. Montandon, Anamarija Fofonjka, Stanislav Smirnov, and Michel C. Milinkovitch. A living mesoscopic cellular automaton made of skin scales. *Nature*, 544:173–179, 2017. doi:10.1038/nature22031.

[3] A. Deutsch, P. Maini, and S. Dormann. *Cellular Automaton Modeling of Biological Pattern Formation: Characterization, Applications, and Analysis*. Modeling and Simulation in Science, Engineering and Technology. Birkhäuser Boston, 2007.

[4] JS Langer. Theory of nucleation rates. *Phys. Rev. Lett.*, 21:973–&, 1968. doi:10.1103/PhysRevLett.21.973.

[5] A. Novick-Cohen. The nonlinear Cahn - Hilliard equation: Transition from spinodal decomposition to nucleation behavior. *J. Stat. Phys.*, 38:707–723, 1985. doi:10.1007/bf01010486.

[6] D. W. Oxtoby and R. Evans. Nonclassical nucleation theory for the gas-liquid transition. *J. Chem. Phys.*, 89:7521–7530, 1988. doi:10.1063/1.455285.

[7] JJ De Yoreo, PUPA Gilbert, NAJM Sommerdijk, RL Penn, S Whitelam, D Joester, HZ Zhang, JD Rimer, A Navrotsky, JF Banfield, AF Wallace, FM Michel, FC Meldrum, H Colfen, and PM Dove. Crystallization by particle attachment in synthetic, biogenic, and geologic environments. *Science*, 349:aaa6760, 2015. doi:10.1126/science.aaa6760.

[8] M Kumar, H Luo, Y Roman-Leshkov, and JD Rimer. Ssz-13 crystallization by particle attachment and deterministic pathways to crystal size control. *J. Am. Chem. Soc.*, 137:13007–13017, 2015. doi:10.1021/jacs.5b07477.

[9] M Weiss and FJ Elmer. Dry friction in the frenkel-kontorova-tomlinson model: Static properties. *Phys. Rev. B*, 53:7539–7549, 1996. doi:10.1103/PhysRevB.53.7539.

[10] T Strunz and FJ Elmer. Driven frenkel-kontorova model. i. uniform sliding states and dynamical domains of different particle densities. *Phys. Rev. E*, 58:1601–1611, 1998. doi:10.1103/PhysRevE.58.1601.

[11] T Strunz and FJ Elmer. Driven frenkel-kontorova model. ii. chaotic sliding and nonequilibrium melting and freezing. *Phys. Rev. E*, 58:1612–1620, 1998. doi:10.1103/PhysRevE.58.1612.

[12] D Bonn and D Ross. Wetting transitions. *Rep. Prog. Phys.*, 64:1085–1163, 2001. doi:10.1088/0034-4885/64/9/202.

[13] H Hinrichsen, R Livi, D Mukamel, and A Politi. Model for nonequilibrium wetting transitions in two dimensions. *Phys. Rev. Lett.*, 79:2710–2713, 1997. doi:10.1103/PhysRevLett.79.2710.

[14] J. H. Snoeijer, J. Ziegler, B. Andreotti, M. Fermigier, and J. Eggers. Thick films of viscous fluid coating a plate withdrawn from a liquid reservoir. *Phys. Rev. Lett.*, 100:244502, 2008. doi:10.1103/PhysRevLett.100.244502.

[15] D. Bonn, J. Eggers, J. Indekeu, J. Meunier, and E. Rolley. Wetting and spreading. *Rev. Mod. Phys.*, 81:739–805, 2009. doi:10.1103/RevModPhys.81.739.

[16] R. Adler. A study of locking phenomena in oscillators. *Proc Inst Radio Engin*, 34:351–357, 1946. doi:10.1109/jrproc.1946.229930.

[17] F Haudin, RG Elias, RG Rojas, U Bortolozzo, MG Clerc, and S Residori. Front dynamics and pinning-depinning phenomenon in spatially periodic media. *Phys. Rev. E*, 81:056203, 2010. doi:10.1103/PhysRevE.81.056203.

[18] P Gandhi, E Knobloch, and C Beaume. Dynamics of phase slips in systems with time-periodic modulation. *Phys. Rev. E*, 92:062914, 2015. doi:10.1103/PhysRevE.92.062914.

[19] U. Thiele. On the depinning of a drop of partially wetting liquid on a rotating cylinder. *J. Fluid Mech.*, 671:121–136, 2011. doi:10.1017/S0022112010005483.

[20] Vladimir I. Arnold, Valery Kozlov, Anatoly I. Neishtadt, and E. Khukhro. *Mathematical Aspects of Classical and Celestial Mechanics (Encyclopaedia of Mathematical Sciences)*. Springer, 2010.