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# Magnetically interacting particles in tilted periodic potentials: Theory and experiment

We focus on single particle and collective effects in suspensions of magnetically interacting colloidal particles driven above periodic potentials, which can be addressed both theoretically and experimentally. We show that the description of a few relatively complex experimental systems can be mapped onto a class of one dimensional Frenkel-Kontorova models. We start by shortly considering the overdamped dynamics of a single particle in a tilted periodic potential [1] and dynamic mode locking under temporal modulation [2] and then proceed to the effects of chain assembly, depinning and front propagation [3]. The analytic and numerical predictions are in good agreement with the experimental results.

[1] M. Juniper, A. Straube, D. Aarts, R. Dullens, Phys. Rev. E 93, 012608 (2016)
[2] M. Juniper, A. Straube, R. Besseling, D. Aarts, R. Dullens, Nat. Comm. 6, 7187 (2015)
[3] F. Martinez-Perdrero, P. Tierno, T. Johansen, A. Straube, Sci. Rep. 6, 19932 (2016)