



TECHNISCHE UNIVERSITÄT
CHEMNITZ

Institut für Physik Physikalisches Kolloquium Sondervortrag



Dienstag, 19.12.2017, um 17:15 Uhr

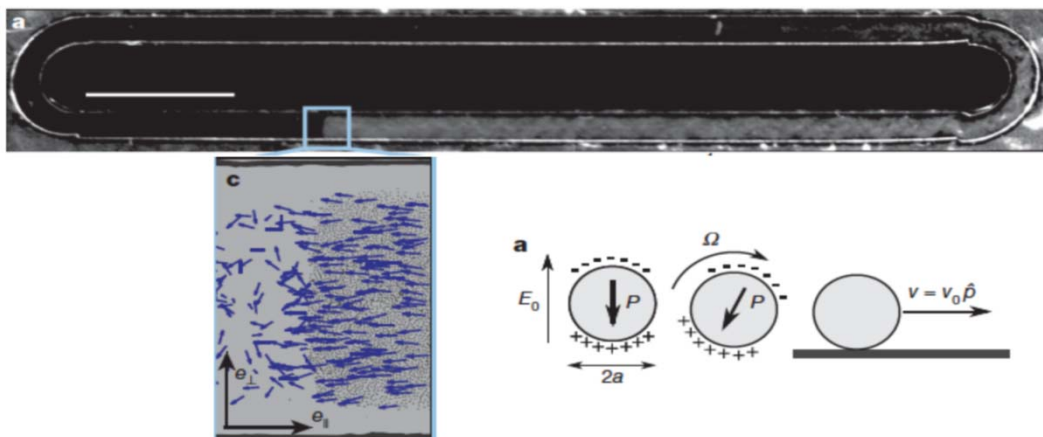
Ort: Reichenhainer Str. 70;
Physikgebäude, Raum 2/P032

Prof. Dr. John J. Toner

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Birds, magnets, soap, and sandblasting: surprising connections in the theory of incompressible flocks

In this talk I'll describe the hydrodynamic theory of the motion of incompressible flocks: that is, collections of self-propelled entities ("birds") that are packed so tightly together that their density cannot change as they move. In two dimensions, this problem can be mapped onto an equilibrium magnet with a peculiar constraint. This problem, in turn, can be shown to be equivalent to a 2d smectic ("soap"), with the flow lines of the flock playing the role of the smectic layers. Finally, this smectic problem can be mapped onto the 1+1 dimensional KPZ equation, which describes the growth or corrosion ("sandblasting") of a one dimensional interface. The scaling properties of this last system, which have been known exactly for a long time, can thereby be used to determine those of incompressible 2d flocks. One important implication of the resulting scaling laws is that such flocks can exhibit long-ranged order in two dimensions, unlike their equilibrium counterparts.



Systems with **long-ranged** hydrodynamic interactions (e.g., "Quincke rotators" (1))

(1) A. Bricard, J-B. Caussin, N. Desreumaux, O. Dauchot, and D. Bartolo, *Nature*, **503**, 95 (2013)

Alle Zuhörer sind ab 17:00 zu Kaffee und Tee vor dem Seminarraum eingeladen.

Informationen zum Vortrag erteilt:
Prof. Dr. Günter Radons, Tel. 0371 531- 33205



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