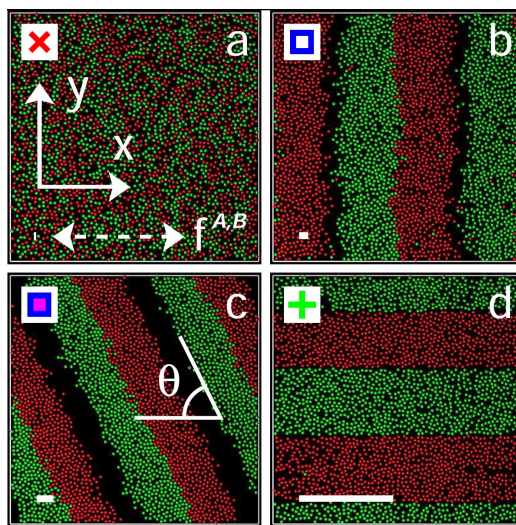


# Colloidal dispersions out of equilibrium

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Dispersions of colloidal particles are excellent model systems of classical statistical mechanics in order to understand the principles of self-organization processes. Using an external field (e.g. electric or magnetic field) the effective interaction between the colloidal particles can be tailored and the system can be brought into non-equilibrium in a controlled way. Glass formation after an ultrafast quench in a two-dimensional superparamagnetic binary colloidal mixture [1] will be discussed as well as lane [2,3,4,5,6] and band [7] formation in mixtures of charged suspensions and dusty plasmas driven by an electric field. Finally hydrodynamic instabilities will be addressed in sedimenting colloids [8].



BD simulation snapshots for oppositely driven particles and different Peclet numbers. The drive is sinusoidal in time. In (a) the coordinate frame is shown and the direction of the driving field is indicated by the broken arrow. In [(a)-(d)] the length of the solid bars (bottom left corner) correspond to the amplitude of a free driven particle. Stable steady states are: (a) disordered, (b) band formation, (c) tilted structure, and (d) lane formation. From Ref. [7].

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