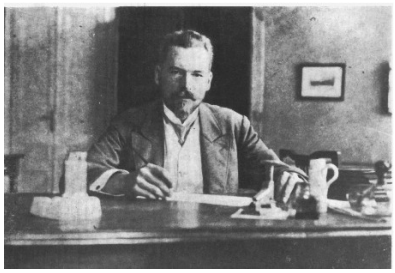

Contribution ID: **17** Type: **Invited talk**

Dynamic crossover in homogeneous active matter

Wednesday, 29 September 2021 16:00 (30 minutes)

The dynamic critical behaviour of active matter systems is of theoretical interest in itself but also because of its relevance to swarming in biological groups, where the dynamic critical exponent can be an element to discriminate between alternative models. Here we study the crossover between the equilibrium and off-equilibrium dynamic universality classes in the Vicsek model near its ordering transition. Building on the incompressible hydrodynamic theory of Chen et al. [New J. Phys. **17,** 042002 (2015)], we show that increasing activity leads to a renormalization group (RG) crossover between the equilibrium ferromagnetic fixed point (with dynamical critical exponent $z = 2$) and an off-equilibrium active fixed point (with $z \approx 1.7$ in $d = 3$). We show in numerical simulations that the classic Vicsek model in the near-ordering regime displays a change in the effective dynamical exponent as speed is increased, in in remarkable agreement with the RG prediction. Finally we show that the equilibrium to off-equilibrium crossover is ruled by a characteristic length scale, beyond which active dynamics takes over.

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