# Compensated cholesterics of helical mesogens: insights from simple microscopic models

*H. H. Wensink, S. Ruzicka, L. Morales Anda* [1],
[1]Laboratoire de Physique des Solides, Université Paris-Sud/Paris-Saclay & CNRS, Orsay, France

We study the pitch of cholesteric assemblies of helicoidal patchy cylinders as a generic model for chiral biopolymers and helix-shaped colloids. Using microscopic theory and computer simulation we find that the handedness of the chiral assembly may spontaneously flip sign upon changing the system density or temperature while preserving the chiral features of the individual particles. We show that these inversions are generic and can be expected in cholesteric phases of both thermotropic and lyotropic origin [1,2]. The mechanism underpinning the symmetry inversions can be explained in terms of an antagonistic effective torque acting between helical rods. In a second model we take a closer look at steric chirality of weakly curled hard rods in order to assess the impact of short- versus long-ranged chiral forces on the pitch [3]. In the final part I will briefly discuss the role of director fluctuations and the impact of concentration fluctuations and external fields on the topology of the helicoidal director field.

*References*

[1] H. H. Wensink, *EPL* **107**, 36001 (2014).
[2] S. Ruzicka and H. H. Wensink, *Soft Matter* **12**, 5205 (2016).
[3] H. H. Wensink and L. Morales Anda, *J. Chem. Phys.* **143**, 144907 (2015).