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## Complex helical smectic phases made of achiral molecules

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Intensive research focused on chiral liquid crystals (LCs) has been driven by their unique ability to exhibit tunable physicochemical properties and structural complexity, which can rival sophisticated natural materials. I will provide insights into liquid crystalline phases composed of achiral molecules that demonstrate chiral structure and/or chiral morphology. The discussion will begin with an exploration of recent advancements in the discovery of new classes of chiral LCs, made possible by the application of resonant X-ray scattering. This technique is sensitive to molecular orientation modulations, enabling the acquisition of information that is often challenging to obtain using other methods. The liquid crystalline phases serve as excellent examples of systems with inherent chirality capable of propagating across structures of varying length scales. The study delves into helical assemblies and the intriguing phenomenon of mirror symmetry breaking, which occurs spontaneously in materials where chirality emerges from achiral molecules.

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