Chirality amplification in spherically confined chromonics

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Chirality, whether induced or spontaneous, in natural systems remains a fascinating and complex phenomenon. In recent years, a lot of attention has been focused on the chirality of chromonic liquid crystals, a class of materials that is able to self-assemble in columnar structures. The reflection symmetry breaking observed in chromonic liquid crystals confined in curved geometries, like tactoids, microspheres or capillaries, has been a subject of ongoing investigations. This spontaneous intrinsic twist can be enhanced by doping nematic chromonics with L- and D- peptides. However, the underlying mechanisms through which chirality emerges, from molecular interactions to the organization of supramolecular structures, are still not fully understood. Although the assembly mechanism is common to most chromonic materials, the interfacial phenomena and the resulting induced chirality are strongly dependent on the chromonic molecule itself. Understanding the key factors that enhance chirality induction is essential for the development of novel materials capable of forming chiral macroscopic structures with tailored optical properties, such as selective reflection. In this talk, I present a comparative study involving a non-commercial chromonic compound, a synthesized, metal-containing complex $[(Bpy\text{-}OH)_2Ag][CH_3COO]\cdot H_2O$, and two model chromonics, each exhibiting distinct behaviours in response to chirality induction.