<del>令和7年度奨励会外国人研究者講演会</del> 学術変革Bスケール横断分析セミナー <u>第 75 回「工学とバイオ」セミナー/ MMCもしかする未来の化学</u>

## Chiral emissive thin films and *J*-aggregates

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## Date: June 4, 2025 (16:00~17:00) Place: IIS, As303 / 304

## Abstract :

The enantiopure synthesis of molecular lemniscates (figure-of-eight molecules) is always challenging.

Here we will discuss the design and synthesis of enantiomers of a [5]helicenoid derived molecular lemniscate, in which two homochiral helicenes are linked via the formation of two azine motifs. We demonstrate that these molecules, and their helicenoid constituents, are also excellent chiral dopants that induce dissymmetry in the ground and excited states of the achiral emissive polymer F8BT, leading to high CPL activity.<sup>1</sup> The ability to control the handedness of the helicenoid dopants via enantiopure synthesis affords control of the sign of circularly polarised emission. The second part of the talk will focus on the vortex-induced chirality in *J*-aggregates of achiral molecules. We show that the handedness of the vortex induces dissymmetry in the ground states of cyanine-dye aggregates<sup>2</sup> and, in certain cases, the symmetry breaking events are observed in the excited state as well. These methods of inducing large dissymmetry factors in both achiral emissive polymers as well as in *J*-aggregates of achiral molecules allow us to produce new materials of great interest for next-generation optoelectronic technologies.



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