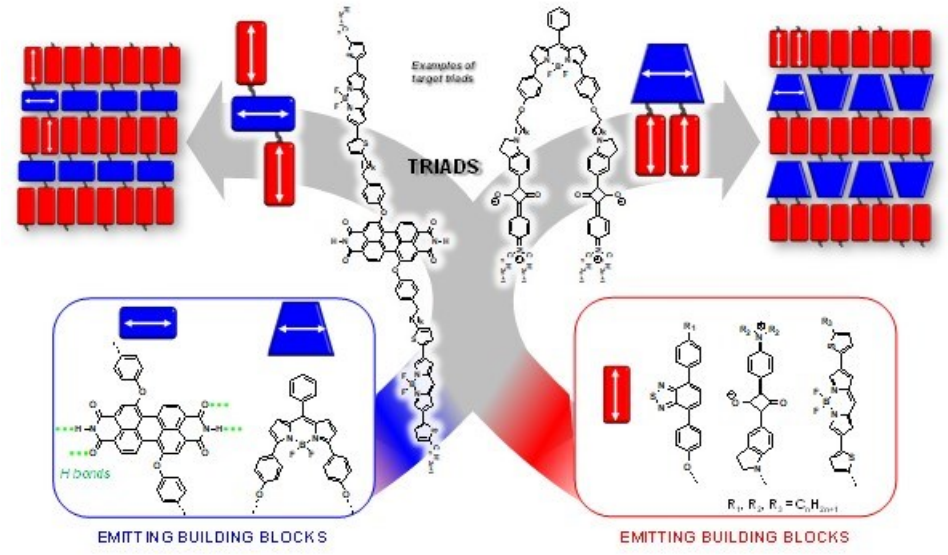
Pr. David Kreher (david.kreher@uvsq.fr)
Emmanuel Allard (emmanuel.allard@uvsq.fr)
Jason Bessonnet (jason.bessonnet@universite-paris-saclay.fr)

Internship offers (LESOMMETA)

2023-2024

In the context of the market of organic emitter growth, we must obtain better control of different parameters to control light emission. For that, we use a new type of organic material, hyperbolic metamaterials (HMMs). This new emitter type allows to control of different factors as permittivity to obtain anisotropic light.

In the literature, HMMs are mainly composed of inorganic substrates and are difficult to produce rapidly and efficacy. To ameliorate the process, we proposed to use liquid crystal dyes to obtain the same properties as inorganic HMMs (following figure). To do that we explore different types of TRIADS to create a multi-lamellar system with a perpendicular dipole transition moment between two blocks of the final molecule (in red and blue on the scheme).



Depending on the progress of the work, the trainees will have different possible missions:

- Trying to make new TRIADS with Squaraine dyes, PDI, and BODIPYs, and observing their different properties (optical and structural).
- Use the previous TRIADS and modify the molecular bridge between the two entities (change the chain length or the types of the link), also the possibility to explore the different types of alkyls chain side of the TRIADS in order to view the differences changes in crystal liquid states.
- Other possibilities to define for the trainees.

The trainees will use photophysical measurements (absorption UV-visible, fluorimetry, and quantum yields) and structural determination (TGA, DSC, POM, XRD, and surface measurement) in all cases. The trainees can also go to Sorbonne University and CEA, our two partners for this project to perform some characterizations.

The internship will be for a 5/6 month duration at “Institut Lavoisier de Versailles” (ILV) on the UVSQ university campus.