

## Master 2 Internship project proposal

(Starting: February 1<sup>st</sup> 2024, Duration: 5/6 months)

**A PhD position financed by the ANR will be then dedicated to this subject**

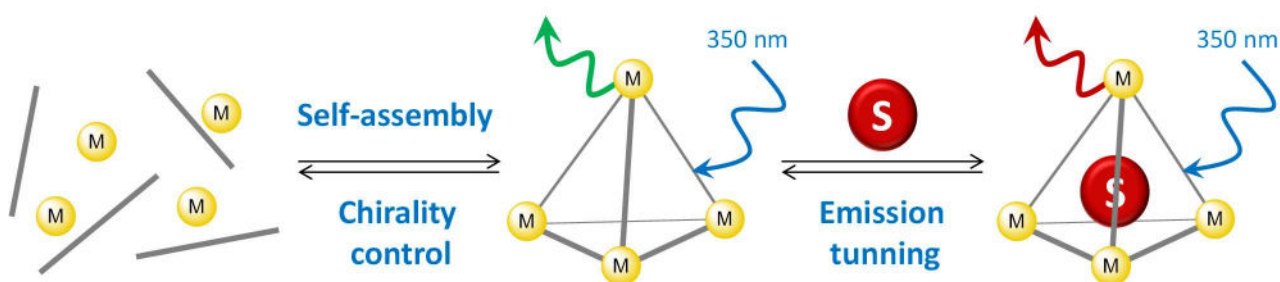
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### Luminescent chiral molecular cages for probing and imaging

**Key words:** Supramolecular chemistry, Coordination chemistry, Molecular cages, Luminescence, Chirality.

#### Context.

The development of molecular systems emitting in the Near-Infra-Red remains an important challenge for bio-imaging. The combination of luminescence and chirality offers new routes to increase contrast and perform deeper tissue penetration of light. Supramolecular chemistry provides a promising bio-inspired strategy to control the chirality of NIR-emitting coordination complexes in molecular cages. The emission properties of the latter supramolecular self-assemblies should be tuned by recognition of small molecules in particular chiral ones that will allow developing applications in probing. Our aim is to synthesize tetrahedral molecular cages holding NIR emitting coordination complexes at vertices and study (i) the effect of the chirality of the assembly on luminescence and (ii) the effect of encapsulation of molecules on emissive features. A special focus will be put on controlling the chirality of assemblies.



#### Objectives.

The objectives of this internship will be to synthesize ligands (organic), molecular cages (coordination), and controlling the chirality of cages by introduction of chiral bias. The chiroptical and emissive properties of the synthesized cages will be then studied (spectroscopic methods).

#### Work plan.

The student will first conduct organic synthesis of ligands before synthesizing the molecular cages by self-assembly. The effect of different chiral bias (counter anion, chiral ligand) on the chirality induction will be then investigated. Finally, the student will focus on analyzing the emission properties of cages, in particular upon encapsulation of substrates.

#### Remuneration.

The student will earn the legal internship compensation amounting to about 600 € / month.

#### Application.

To apply, send to [benjamin.doistau@u-paris.fr](mailto:benjamin.doistau@u-paris.fr) your **CV**, the **name of two former advisors** and the **transcript of the marks** of your Master degree (1<sup>st</sup> year).

#### PhD position after the internship.

After evaluation of his/her work by the supervisors, the student may be proposed a PhD position financed by the ANR, to continue working on this subject. (Starting of PhD: October 1<sup>st</sup> 2024 / Duration of PhD: 3 years)