

Design and characterization of new laser dyes for organic laser diode

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Since the first demonstration of the organic laser diode (OLD)[1], a continued effort has been devoted to the design of more efficient devices. The structure of the OLD is very similar to the ones used for Organic Light Emitting Diode (OLEDs). However, in the example developed by Adachi *et al.*, the organic dye emits in the blue part of the spectrum which prevent long-lived devices since blue OLEDs are not yet very stable. In this context, there is a huge need of new laser dyes that emit at longer wavelength than the blue. For instance, orange and NIR emitting dyes that show laser effect have been published recently.[2-4] While benzothiadiazol derivatives do not harvest triplet excited, curcuminoid borondifluoride shows strong thermally activated delayed fluorescence.[2-3] In addition to the properties of the dye, its aggregation is often an issue. To tackle this problem, an approach based on dendrimer can be used.

This project aims at designing, synthesizing and characterizing new families of dendritic dyes that can be used in OSL type of devices. In addition to synthesis, measurement of the photophysical properties and participation to advanced spectroscopic characterization (as transient absorption spectroscopy, amplified spontaneous emission and lasing) will be performed. This project is interdisciplinary and will involve the collaboration with various chemist and physicist in IPCMS and in Strasbourg.

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