Master/PhD in Biophysical Opto-Acoustics (BOA)

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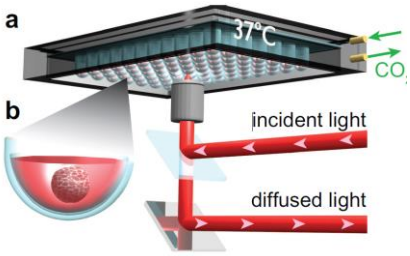
Development of a stimulated Brillouin spectrometer for ultra-fast imaging of biological tissues

In recent years, a new technique for the quantitative imaging of biological tissues based on micro-Brillouin spectroscopy has emerged. This technique allows characterizing the viscoelastic properties by measuring the hypersonic waves propagating within the tissue. This non-invasive optical method has been used successfully to live organisms, single cells, or tissues with a contrast based on the mechanical properties of the sample.



a. Schematic of the actual setup. The laser beam is fed into a standard life science microscope. The diffused light is collected and sent to the spectrometer. **b.** Zoom-in on a single well containing a tissue.

In this Master's project we want to improve the speed of acquisition by proposing a new type of microscope based on stimulated Brillouin scattering. The objective of this internship will be to design, build and characterize the microscope, and couple it to the existing spectrometer. During his internship the student will have to

1) carry out the optical assembly

2) implement the acquisition on simple liquids as a proof-of-concept

3) test the device on single cells produced by the Biophysics team.

This work will leverage the photonics and biophysics skills of the host team.

Duration: The internship is scheduled to start ideally on February 2024, for a duration of 6 months.

Environment: The candidate will work in the Biophysics team at ILM, under the supervision of Maroun Abi Ghanem and Thomas Dehoux.

Requirements: Candidates should have a background in physics, acoustics, optics or spectroscopy. Experience with microscopy is a plus.

The project can continue as a PhD

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