

MASTER M2 PROJECT 2019

At : Institut Fresnel, Domaine Universitaire St Jérôme Marseille

Optical transport properties of a mouse spinal cords (optics : setup building and data analysis)

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Keywords: optics, microscopy, electronics, programming.

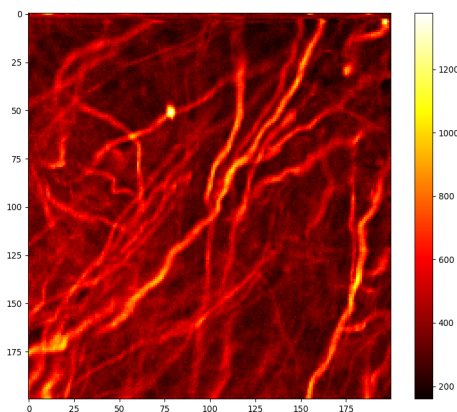
The MOSAIC team at Institut Fresnel (<http://www.fresnel.fr/mosaic>) works in collaboration with Institute of Neurosciences La Timone to develop novel techniques of neural system diagnostics. One of the current projects is centered about study of myelin in mouse spinal cord depending on various factors in mouse environment. It is believed that increase of myelination of the axons leads to a change in scattering properties of the spinal cord (fig. 1).

Scattering can be characterized by transport properties, namely scattering and transport mean free

paths. Recent work (see the reference) proposed a new method of measuring transport properties of scattering samples with interference technique.

The goal of this project is to reproduce the technique in the lab of MOSAIC group, creating a new setup for *in situ* routine study of mouse spinal cord scattering properties.

The student together with a postdoc fellow will build the actual set-up and write a software for data analysis. Subsequently once the tool is established the study of samples (mice grows in various conditions) will be performed in order to prove the concept of transport properties dependence of myelination. Quantitative correlation between above mentioned will be performed.



Required skills and interests: basic knowledge in optics and microscopy, electronics, statistical methods, image processing and programming .

Financial support: 570 € / month

Reference: Mariani, F., Löffler, W., Aas, M., Ojambati, O. S., Hong, P., Vos, W. L., & van Exter, M. P. (2018). Scattering media characterization with phase-only wavefront modulation. *Optics Express*, 26(3), 2369. <https://doi.org/10.1364/OE.26.002369>