

OPTICAL SENSOR FOR AQUEOUS HEAVY METAL DETECTION: DEVELOPMENT OF A LOW NOISE AND COMPACT ELECTRONIC SETUP FOR THE OPTICAL SPECTRA ACQUISITION AND ANALYSIS

LABORATORY : Institut Lumière Matière
IN COOPERATION WITH Laboratoire de physique à l'ENS de Lyon
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LEVEL : M2
TEAM(S) : AGNANO

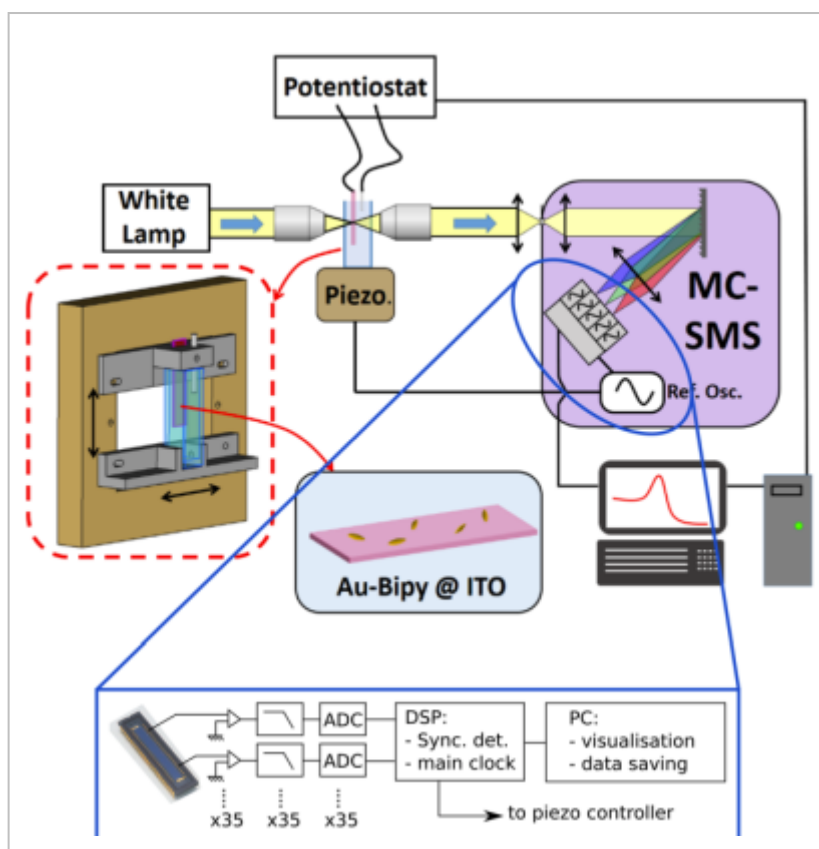
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KEYWORD(S) :

SCIENTIFIC CONTEXT :

Among the numerous environmental and societal issues the world is facing nowadays, air and water pollution are of major concerns. In that context, the development of novel, rapid and highly sensitive detection technique becomes crucial. In the context of an ANR project, a PhD student will develop a new generation of multifunctional plasmonic nanoparticles to sense the pollutants and measure them with the spatial modulation spectroscopy technique to reach the high sensitivities needed. However sensitive, this method is slow, due to the point-by-point acquisition of the optical spectrum. The proposed internship is to make a new compact electronic setup to make the technique 30-100 times faster by allowing the simultaneous acquisition of several points.



MISSIONS :

The trainee will design a compact electronic setup to simultaneously acquire the DC+AC response of a linear photodiode array. The system will include a low-noise current-to-voltage conversion, analog to digital conversion and a numerical synchronous detection. The first step will be the design, simulation and realization of a tailored and compact I-V to allow its duplication for all the photo-diode pixels. Secondly, a digitization stage and numerical treatment will have to be chosen and implemented if time allows.

OUTLOOKS :

This internship does not lead to an offer of a thesis