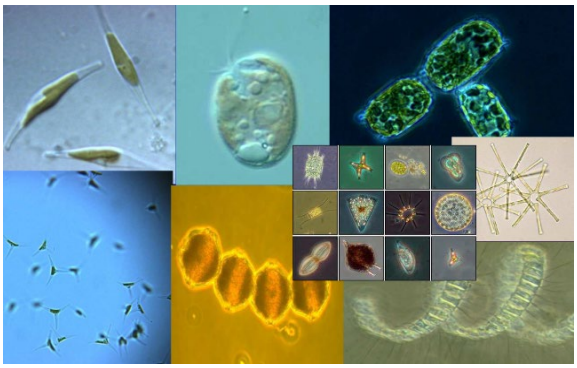
INTERNSHIP PROPOSAL

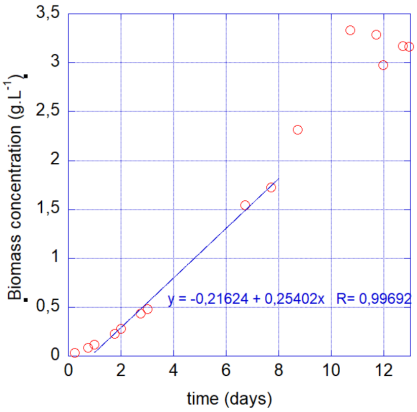
Laboratory name: Laboratoire de Physique des Solides
CNRS identification code: UMR 8502
Internship director'surname: EVEN Catherine
e-mail: catherine.even@universite-paris-saclay.fr Phone number:
Web page:
Internship location: LPS, 1 rue Nicolas Appert, 91405 Orsay

Thesis possibility after internship: YES
Funding: NO If YES, which type of funding:

Measurement of CO_2 capture by cyanobacteria

In the context of climate change, to achieve carbon neutrality, we need not only to reduce our CO_2 emissions, but also to capture atmospheric CO_2.
Cyanobacteria and microalgae are photosynthetic microorganisms with great potential, accounting for half of all photosynthesis worldwide (figure below, left). Moreover, they absorb CO_2 more efficiently than plants during growth. They are being extensively studied with a view, among other things, to the production of third-generation biofuels. However, their CO_2 capture potential has been less well studied. In the scientific literature, there are in fact two methods for measuring CO_2 uptake by microorganisms: a "biological" method consisting in weighing the biomass obtained, and a "physical" method in which the evolution of the CO_2 level in the gas phase above the solution containing the microorganisms is measured. We propose to combine these two methods in order to quantify precisely the quantity of carbon stored in the biomass, something that has been done very little to date. The experiment we are planning involves tracking the evolution over time of the carbon stored in the biomass, solution and gas, enabling us to measure CO_2 uptake precisely, while tracing the growth curve of the microorganisms (figure below, right). To this end, we have built a new custom photobioreactor. The intern's job will be to carry out experiments using this photobioreactor with the cyanobacterium *Synechoscystis* PCC6803, while building a model to interpret the results obtained.





Left: diversity of microalgae and cyanobacteria under the light microscope;
Right: growth curve of the cyanobacterium Synechocystis PCC6803 obtained in our team

Please, indicate which speciality(ies) seem(s) to be more adapted to the subject:

Condensed Matter Physics: NO Soft Matter and Biological Physics: YES
Quantum Physics: NO Theoretical Physics: NO