INTERNSHIP PROPOSAL

Laboratory name: Laboratoire de Physique des Solides - Orsay
CNRS identification code: UMR 8502
Internship director'surname: Eric Raspaud / Valérie Barbe
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Internship location: Laboratoire de Physique des Solides - Orsay

Thesis possibility after internship: YES
Funding: YES/NO If YES, which type of funding: ED and others

Plastic big Brother: Towards a continuous monitoring and quantitative analyses of microbial plastic degradation

Plastic pollution is one of the major social issues affecting many environments and human health. Over the past twenty years, a great deal of multidisciplinary research has been aimed at combating this plague and developing new materials that are easily degradable or reusable. Here we would like to focus on the microscopic mechanisms of biodegradation in the marine environment of bio-sourced polymers with highly interesting commercial properties: the polyhydroxyalkanoates (PHA). Recently V. Barbe, S. Bruzaud and collaborators have shown the ability of the marine strain Alteromonas plasticoclasticus MED1 to use some specific PHA copolymers as sole carbon source and further analyses of its genome revealed that a secreted enzymes (called depolymerase) is involved in the first step of PHA depolymerization. This multidisciplinary project aims to characterize in more details how bacteria invade and erode a semi-crystalline / amorphous polymeric surface and how different the degradation is from an abiotic medium which just contains soluble extracted depolymerases.
The intern will take part in the new collaborative research project, conducted by Valérie Barbe (microbiologist, vbarbe@genoscope.cns.fr) from Génomique Métabolique (UMR8030), CEA-Genoscope Evry, with Eric Raspaud (biophysicist, eric.raspaud@universite-paris-saclay.fr) from Laboratoire de Physique des Solides, Paris-Saclay University, and with Stéphane Bruzaud (polymer chemist, stephane.bruzaud@univ-ubs.fr) from the University of South Brittany.

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