



Call for a Post-Doctoral position

Picosecond Ultrasonics in a single cell: PicoBio *Toward the single cell echography*

Starts in 2009

Laboratoire de Mécanique Physique (LMP) – Université de Bordeaux, CNRS

CONTEXT

In the context of emerging nanomedicine science and technology, experimental determination of physical properties of in vitro single cells is an important step toward better understanding of cellular properties, both structural and functional. Knowledge of optical properties, for instance cell refractive index, may provide indications of local cellular composition and structure, while determination of mechanical properties such as cytoplasm compressibility and effective cell viscosity can help to understand and model cellular and intracellular motility processes. Also, in vitro nanomechanical studies have shown that cultured cancer cells are elastically softer than healthy ones, and recent measurements on cells from cancer patients suggest that this mechanical signature may be a powerful way to detect cancer in the hospital.

PROJECT

The proposed project is dedicated to the improvement of the picosecond ultrasonic technique for the study of mechanical and thermal properties of biological cells. The picosecond ultrasonics technique is based on the use of femtosecond laser pulses to perform generation and detection of GHz acoustic waves in submicrometric films, multilayers structures, and other nanostructures. This technique, in spite of its young age, has demonstrated many important results in the area of non-destructive testing of materials in micro-electronics and solid state physics. Picosecond ultrasonic imaging in the frame of this project should allow to increase drastically the space resolution of acoustic imaging and to obtain more clear information about changes of biomechanics of the cell. The project will specially be focused on the field on biomaterials: quantitative measurements of the mechanical properties and adhesion of human bone cells on functionalized prosthesis.

COLLABORATIONS

The 2 major collaborations are:

- 1) U577: INSERM Biomaterials and Tissue Engineering laboratory (<http://www.u577.u-bordeaux2.fr>)
- 2) CPMOH: CNRS physical optics laboratory (<http://www.cpmoh.cnrs.fr>)

QUALIFICATIONS AND EXPERIENCE

The candidate will have extensive hands-on experience in experimental physics involving optical technics. Knowledge of pump-probe experiments in the biological fields is a strong asset. The candidate will be in charge of the development and use of the experimental set-up. Skills in data acquisition and experiment control are welcome.

SALARY: 24 500 €/year

From the French National Agency for Research (ANR)

CONTACT

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Qualified persons interested to work in the above field and having relevant expertise are invited to email their applications including a statement of interest besides the usual documents (CV, publication list, certificates, addresses of references).

