

## **INTERNSHIP PROPOSAL**

*(One page maximum)*

Laboratory name: Matière et Systèmes Complexes

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Thesis possibility after internship: YES

Funding: NO

If YES, which type of funding:

### **ENVIRONMENTAL CONTROL OF CRACK GROWTH IN A PROTEIN GEL**

Summary (half a page maximum)

The crucial role played by proteins in life as we know it is due to their ability to fold in water. Ions and organic cosolvents are known to interact with proteins and affects their folding.

We have recently published (to appear in International Journal of Fracture) a proof of concept of a method to decipher the protein/environment interaction close to a slowly moving crack tip in a protein gel, namely gelatin where cross linking is due to the partial renaturation of the native collagen. Close to a growing crack the collagen-like crosslinks are on the verge of unfolding and the growth rate is very sensitive to solvent changes.

We propose to investigate the role of ions on the network stability and to compare it to the empirical ordering of ions in « the Hofmeister series », part of the know-how of biochemists, according to their ability to precipitate proteins or protect them again unfolding.

This experimental projects lies where fracture mechanics meets polymer physico-chemistry.

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

Condensed Matter Physics: YES/NO

Soft Matter and Biological Physics:

YES/NO

Quantum Physics: YES/NO

Theoretical Physics: YES/NO