



**SPEAKER: Professor Ludwik Leibler**

Laboratoire Matière Molle et Chimie  
Unité Mixte de Recherche 7167 ESPCI-CNRS, France

**THEME: Polymer-like materials from supramolecular assembly of small molecules**

**PLACE:** FORTH/ICE-HT auditorium

**DATE:** Wednesday, 23<sup>rd</sup> of May, 2007

**TIME:** 17:00

**ABSTRACT:** The mechanical properties of rubbers and plastics spectacularly differ from those of ordinary inorganic and organic solids. Rubbers, for example, exhibit enormous extensibility and ability to recover their original shape and dimensions on release of stresses. Rubber elasticity seems to be a property of macromolecules either covalently cross-linked or connected together by thermoreversible physical associations. Plastics are polymer materials often able to combine light weight high modulus and ductility and toughness. Recent progress of supramolecular chemistry arises the question of whether it is possible that systems made of small molecules exhibit properties of polymer materials;  
I will present some reflections on this issue and in particular present our recent results on molecules that associate via hydrogen bonds to form materials that show recoverable elasticity up to several hundred percent. In striking contrast to conventional cross-linked or thermoreversible rubbers when broken or cut these materials can be simply put together to self-mend at room temperature and recover their enormous extensibility. At high temperatures these materials flow like fluids of small molecules from which they are made. These remarkable properties raise many issues concerning understanding thermodynamic, kinetic and dynamic aspects of such self-assembling systems.