"Microscopic viscoelasticity of polymer solutions and gels observed from translation and rotation of anisotropic colloid probes"

Dr. Pedro Díaz Leyva

Departamento de Física, UAM-I

We probe the mechanics of two different viscoelastic complex systems at a microscopic length scale. The first is made of cross-linked polymer gel and the second consists of a polysaccharide solution, in which spherical birefringent colloidal tracers have been embedded. This method is widely known as optical microrheology. In the present work we focus on both the translational and the rotational motions of the tracers. The significant discrepancies observed between the results obtained by translational and rotational microrheology imply that the two types of motion probe the mechanical response of the matrix in diff erent ways. Taking into account the "sticky" conditions between the surface of the tracers and the complex environment, we suggest a simplified theoretical model to explain the experimentally observed discrepancies in terms of the relationship between the viscoelastic moduli obtained from rotational and translational tracer dynamics.