The National Institute of Science and Technology on Complex Fluids (INCT-FCx)

Antonio Martins Figueiredo Neto

Institut of Physics, University of São Paulo, SP, Brazil

The INCT-FCx gathers professionals in physics, chemistry, biology, pharmacy, medicine, biomedical engineering, and mathematics, around problems requiring a multidisciplinary approach in the area of complex fluids. We have the objective of generating new knowledge, and disseminating this knowledge in the academic world and in the society, about the molecular interactions that produce the complex behavior of liquid crystals and supramolecular structures of biochemical and biological interest. The objects of study are self-aggregated multicomponent systems in thermodynamic equilibrium, as liquid crystals, magnetic colloids, micelles, lung surfactants, surfactant-protein complexes, and human lipoproteins of low and high density. In the case of human lipoproteins, we seek to understand oxidative processes and connections with atherosclerosis. In terms of education, we organize regular schools for undergraduate and graduate students and stimulate the creation of courses (undergraduate and graduate) in the participating schools. In terms of outreaching activities, we work at the high-school level, proposing annual refresher courses for teachers on topics of health, structure of matter, and technologies (structure of matter, new materials, water and biological fluids and the impact on society and human health). We also organize outreach activities for the general public in the form of annual exhibitions in places of great movement of people (central subway stations and other places of great influx of people). In this talk we will present our recent results in the interface physics/biology, in particular the z-scan nonlinear optical results of human low-density lipoproteins obtained from patients with diabetes and periodontite, before and after the odontological treatment.

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