**Structural and nonlinear optical properties of native and modified human Low-Density Lipoproteins**

**Antonio Martins Figueiredo Neto**

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

afigueiredo@if.usp.br

**Abstract.** The Z-Scan optical technique was recently used to measure the nonlinear optical response of human lipoproteins solutions, in particular Low-Density Lipoprotein (LDL) particles, regarding their oxidative (atherogenic) state. The higher is the oxidation degree of the LDL particle, the smaller is their nonlinear optical response. The main physical process involved in this phenomenon is the formation of a thermal lens in the solution illuminated by a Gaussian laser beam. The main responsible for the absorption of the light (532 nm) are the carotenoids present in the particle. These molecules protect the LDL against oxidation. The higher the carotenoids concentration the greater the amplitude of the thermal lens formed. Different pathologies were investigated following this protocol: diabetic patients with periodontitis and gingivitis and infarcted patients subject to statins treatment. All these aspects will be discussed in the talk. The nonlinear optical response of LDL solutions may be used in the development of new tools to quantify the atherogenic particles in the human blood and the definition of new risk factors to develop cardiovascular diseases. Financial support: CNPq, FAPESP, CAPES, INCT-FCx, NAP-FCx.

****

**Antonio M. Figueiredo Neto, Professor,** has more than 220 papers in international journals, 1 book published by the Oxford University Press, 3 book chapter; more than 300 presentations at international conferences. About 2500 citations (WOS), h = 25. Google Academic: h = 35; citations 5292. Supervisor of 22 defended Ph.D. students and 17 Master dissertations. Member of the Brazilian Academy of Science and The Academy of Science of the State of São Paulo. He works on the Physics of Complex Fluids, especially with liquid crystals, magnetic colloids and fluids of biological interest (human Low-Density Lipoprotein solutions). Specialist in nonlinear optical techniques and SAXS.