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Dr. Sarmiento is a postdoctoral fellow in the complex fluids lab of the University of San Luis Potosí, being part of a nucleus of researchers dedicated to Soft Matter physics. He received his Ph.D. for work on the microrheological properties of thread-like structures such as worm-like micelles, polymers and suspensions of elongated virus, using dynamic light scattering techniques at the National University of México. From this work, he was awarded with a laureate degree from the Institute of Physics of the National University of Mexico. His current research focuses in colloidal dynamics of isotropic and anisotropic colloidal particles under confinement and interacting with complex fluids, as well as the effects of laser-induced external potentials on colloidal dynamics. He is also interested in light propagation in turbid media and its biomedical and colloidal science applications.

“Light as an External Field in Colloidal Dynamics”

Manipulating colloids using light, a technique usually known as optical tweezers, has become an important tool for a wide variety of fields, including soft matter and biophysics. In most applications, a highly focused beam is used to trap a colloidal particle, and by measuring displacements from the center beam, small forces, of the order of pico newtons, can be measured. However less attention have been paid to the use of light as an external field, in which an inhomogeneous distribution of light intensity striking on a colloidal particle induces an external potential that affects its colloidal dynamics. In this talk, I will present recent advances of this novel way to see light-colloid interaction developed in our lab. To begin with, I will show the effects of a periodical distribution of light in the dynamics of both spherical and anisotropic colloidal particles. I will also present a methodology for calculating the energy landscape of anisotropic colloids interacting with a periodical distribution of light, as well as a comparison with experimental evidence. Additionally, an insight of the response of a 2D colloidal crystal, formed by the interaction of spherical colloidal particles with a laser-induced external potential, subject to stress is presented.

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