Harnessing photonic recoil in optically levitated particle through wavefront shaping

H. Marot[1], M. Kleine[1], Y. Louyer[1], N. Bachelard[1]
[1] CNRS, Université de Bordeaux, LOMA, UMR5798, Talence, France

Abstract

Optically levitated nanoparticles form some of the best mechanical resonators available to science. They feature high quality factors, as large as 1011 in some cases, and are remarkably well isolated from their mechanical environment. This makes them good candidates for mesoscopic quantum physics experiments, and for quantum sensing. However, several difficulties remain with the implementation of quantum protocols. In particular, trapping parameters are usually imposed by the optical setup and the laser power. We propose to control the optomechanical parameters using Spatial Light Modulators.