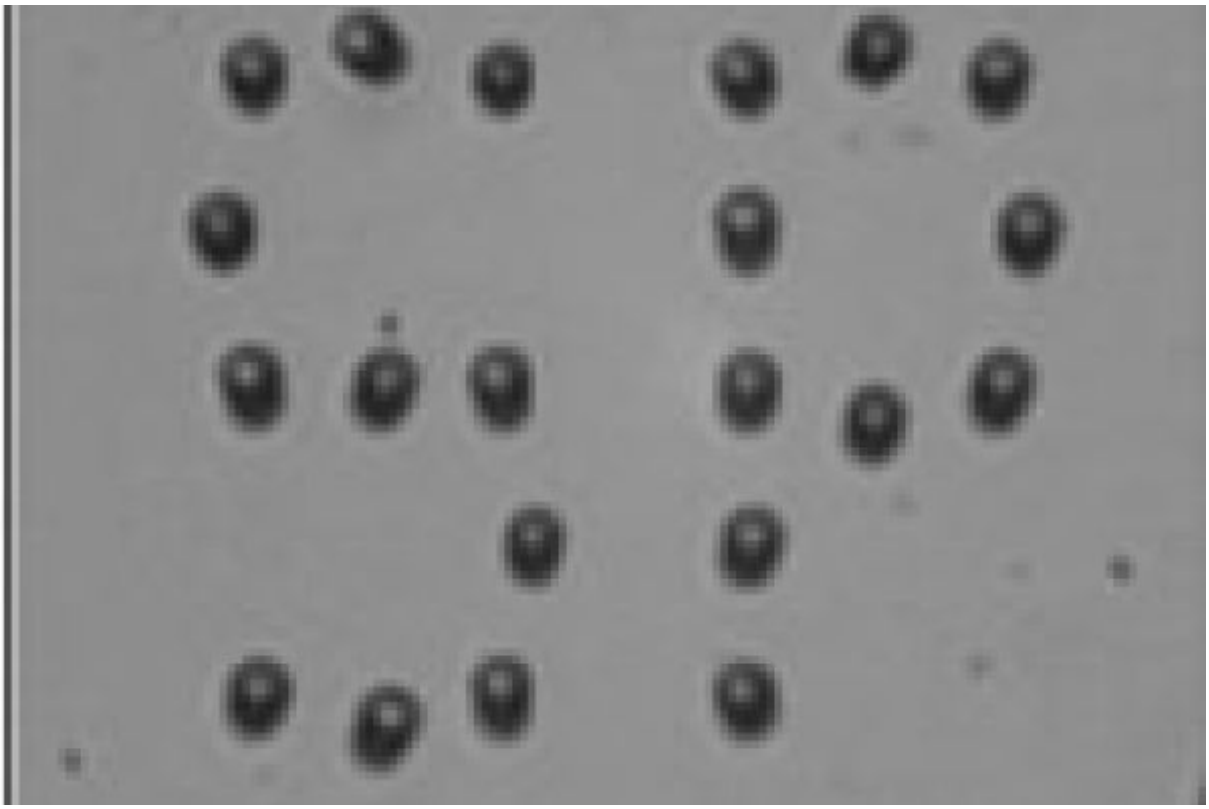

Plasmonic Optical Tweezers in Nature Physics

ICFO?s latest achievements bring us closer to an optically driven lab-on-a-chip

May 23, 2007

The latest achievements of the Plasmon Nano-Optics group led by the ICREA Research Professor at ICFO Prof. Romain Quidant, make more tangible the exiting concept of optically driven lab-on-a-chip. They forge a non-existing bridge between the fields of optical manipulation and surface plasmon (SP) optics, exploiting the enhancement and confinement of SP-fields bounded at metal surfaces to achieve strong optical forces able to manipulate with light small amounts of matter.

Unlike conventional Optical Tweezers, SP tweezers can be designed to become selective to specific objects out of a mix acting as an efficient optical sieve. The novelty of this discovery has been lately acknowledged by the acceptation for publication in Nature Physics and

highlighted in Nature.

This study brings towards a first proof of concept of a novel generation of miniaturized and integrable 2D-optical tweezers based on SP. Their simplicity and flexibility pave the way toward new analytical devices entirely operated with light where specific nano-analytes can be extracted from a complex sample, manipulated and inspected at the chip surface. Such devices would have key implications on our society through low cost and parallel analysis in health care, drug tracking and food control.

The Plasmon Nano-Optics group at ICFO covers different research topics, such as micro- and nano-optical manipulation with plasmon fields, 2D plasmon-based miniaturized optical elements and enhanced light-matter interaction at the nanoscale.

(left to right) Anna Zelenina, Romain Quidant and Maurizio Righini