

Nanostructures for interdisciplinary study

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Summary

In the last few years, there has been a burst in the study and conceiving of new devices for the generation and manipulation of electromagnetic field at the nanoscale, where radiation-matter interaction is strongly enhanced[1]. Several fabrication methods are now available for material preparation and nanostructuring, but only few of them can ensure the stringent design control needed for the effective and reproducible device behaviour.

We report, herein, novel processes of micro and nanofabrication techniques for several applications in different research fields [2].

During the lecture it will be presented selected topics from the research activity that are ongoing at SMILEs at KAUST. In particular it will be highlighted the results on single molecule detection and imaging [3], novel cell manipulation methods and early Cancer detection through novel methods based on miniaturization.

[1] Nanoscale chemical mapping using three-dimensional adiabatic compression of surface plasmon polaritons

F. De Angelis, et al. *Nature nanotechnology* 5 (1), 67-72, 2009

[2] Hot-electron nanoscopy using adiabatic compression of surface plasmons
A Giugni, et al, *Nature nanotechnology* 8 (11), 845-852,2013

[3] Direct imaging of DNA fibers: the visage of double helix

F Gentile et al, *Nano letters* 12 (12), 6453-6458, 2012