

Title: Plasmonic biosensing on the microscale and nanoscale

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Abstract: Optical biosensors based on surface plasmon resonance (SPR) represent an advanced, label-free technology for studying biomolecular interactions and for rapid and sensitive detection of biological and chemical agents. In this doctoral thesis, the extension of the technology towards the microscale and nanoscale is pursued. The work includes both theoretical and experimental aspects. In particular, the presented results include the development of a plasmonic sensor platform with its sensitive area miniaturized to the microscale, detection of individual analyte molecules through nanoparticle labels, determination of the influence of nanoparticle-label size on the response enhancement in SPR biosensors and the development of a biosensor based on localized surface plasmons on nanoparticles and verification of the nanoscale localization of its sensitivity.

Keywords: surface plasmon, biosensor, SPR, nanoparticles