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Optical Nano-antennae as Compact and Efficient Couplers from Free-space to Waveguide Modes

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Optical nano-antennae are one of the possible solutions for coupling free-space radiation into subwavelength waveguides. Our efforts were concentrated on coupling between an optical fibre and a plasmonic slot waveguide. Such coupling is still an issue to be solved in order to advance the use of plasmonic waveguides for optical interconnects.

During the talk, we will present our modelling optimisation, fabrication and measurement of the nano-antennae functionality. For the modelling part, we used CST Microwave studio for optimising the antenna geometry. Various antennae were modelled and fabricated. The fabrication was based on electron beam lithography and lift-off processes. The measurements were performed with scattering scanning near-field microscope and allowed the retrieval of both amplitude and phase of the propagating plasmon.

The obtained values agree very well with the theoretically predicted ones thus validating our approach.