



SEMINAR ANNOUNCEMENT

“Surface modes in an infinite array of nanowires on a material surface and their coupling to atomic systems”

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In this talk we investigate a novel structure consisting of an infinite array of nanowires periodically deposited on the planar interface separating two media: vacuum and dielectric substrate. The surface modes can be surface plasmons, surface phonons, surface excitons or any other type of surfacemodes that the structure supports. The NW system provides confinement in the direction normal to the NW array in addition to the inherent confinement transverse to the interface between the vacuum and dielectric substrate. Such 2-D confinement with rich and controllable parameters can be utilised to generate strong coupling for the interaction of these surface modes with atomic system localised in the vicinity of the structured interface. In order to quantify such effects, a transfer matrix method or other standard methods are developed and used to determine the dispersion relation and the corresponding quantised fields which lead to the evaluation of the coupling (or deexcitation rate) for an emitter localized in the structure. The rate depends critically on various parameters, including the position of the emitter, the nature of the wires, their separation and their number as well as the kind of dielectric substrate on which the wires are deposited. Emitters in the vicinity of structured surfaces are envisaged to be the basis of quantum architectures leading to the realisation of scalable quantum information processing.