ON CORRECTION OF THE RESONANT CONDITION IN THE EFFECT OF SURFACE PLASMON RESONANCE

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Surface plasmon resonance has emerged as a powerful optical detection technique. Among others, one can find its applications in sensorics, material characterization or detection of molecules and their interactions. The existence of surface plasmons can be identified in a setup consisting of a glass prism, thin metallic layer and analyte. This effect manifests itself as a plasmonic wave propagating on a boundary between two layers, which are metal and analyte, and its detection can be performed via measurement of reflectivity of the incident light. Indeed, if we illuminate the prism face under certain angle, spectrum of the reflected light contains a minimum, i.e. a dip. This dip occurs for certain wavelength for which the plasmonic wave is excited. In the other words, it appears for a wavelength, fulfilling a certain resonance condition. The resonance condition provides, after some approximations, widely used expression describing dependence of the resonant wavelength on the angle of incidence. Nevertheless, even this expression has some limits and works well only if certain constraints are imposed. We study possible corrections to this expression providing better match even in the cases where we go behind the constraints.