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Electromagnetic response in Scattering-type Scanning Near-field Optical Microscopy JAVIER AIZPURUA, Donostia International Physics Center, DIPC, F. JAVIER GARCIA DE ABAJO, Donostia International Physics Center and Centro Mixto CSIC-UPV/EHU, PEDRO MIGUEL ECHENIQUE, Donostia International Physics Center, Departamento Fisica de Materiales UPV/EHU, and Centro Mixto CSIC-UPV/EHU — The ability to perform scattering-type Scanning Near-field Optical Microscopy (s-SNOM) and spectroscopy has been demonstrated in different ranges of the spectral response. The information obtained from a particular sample is based on the near-field interaction driven at the s-SNOM cavity. The incoming light activates plasmonic and phononic resonances, which are extremely dependent on the conditions of the electromagnetic cavity. We present a theoretical model of the s-SNOM cavity and perform exact electromagnetic calculations of the optical response of this nanosystem with use of a boundary element method in the frequency domain. We study the coupling between tip and sample, and the influence of the nano and micro-environment in the optical response of this nanosystem both for metallic and phononic materials with resonances in the visible and phonon region of the spectrum respectively. We focus on the study of the response of SiC terraces as a structure with potential application in phononic devices. The results obtained here can be used to interpret and to generate input for optimal performance of the s-SNOM.

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