

Reconstruction of perturbations on a planar surface by using plasmonic resonances

Habib Ammari¹ Doo Sung Choi² and Sanghyeon Yu¹

1) *Department of Mathematics, ETH Zürich, Rämistrasse 101, CH-8092 Zürich, Switzerland*

2) *Department of Mathematical Sciences, KAIST, Daejeon 34141, Korea*

Corresponding Author : Habib Ammari, habib.ammari@math.ethz.ch

ABSTRACT

This paper is related with the inverse problem of reconstructing small and local perturbations of a planar surface using the field interaction between a given plasmonic particle and the planar surface. The aim is to perform a super-resolved reconstruction of the perturbations from changing the plasmonic frequencies of the particle-surface system. In order to analyze the interaction between the plasmonic particle and the planar surface, a well chosen conformal mapping, which transforms the particle-surface system into a layer structure, is used. Then the even Fourier coefficients of the transformed domain are related to the shifts in the plasmonic resonances of the particle-surface system. A direct reconstruction of the perturbations of the planar surface is proposed.