

Supplementary information

For the manuscript:

“THz nanoscopy of plasmonic resonances with a quantum cascade laser”

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This Supplementary Information has 3 pages and 3 figures.

A typical voltage-current-light (LIV) measurement of the laser used in this study, taken with and without feedback provided by a gold mirror, placed at ~ 1 cm, is shown in Fig. 1SI. When the laser is focused onto the tip, the change in power and bias was strongly reduced ($\sim 55\%$) but still detectable.

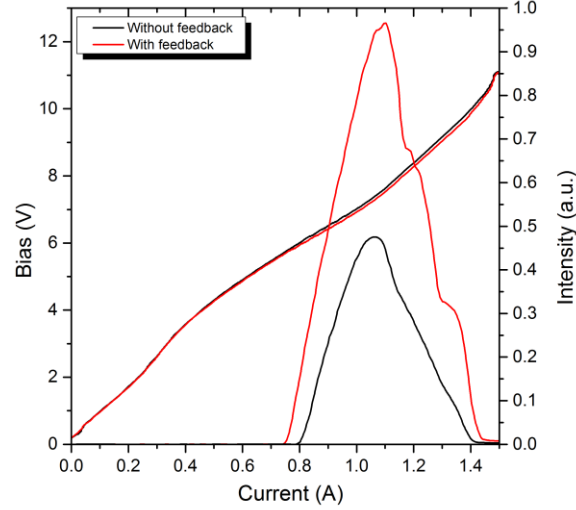


Figure S1. LIV characteristics of the QCL used, taken with and without the feedback provided by a Au mirror placed in closed proximity.

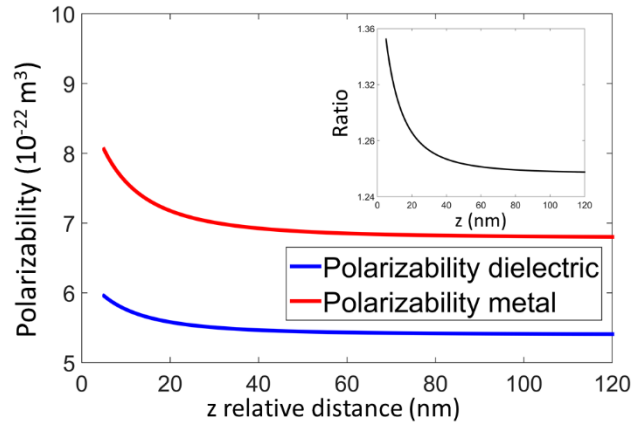


Figure S2. Effective polarizability calculated for the different substrates shown in Fig. 1 in the main text. Metallic substrates tend to increase the effective polarizability in comparison with dielectric materials.

The effective polarizability for the tip/sample system has been calculated according to the model provided in Refs. [38-40]. The values of the polarizabilities obtained by using Eq. 1 at different relative distances between tip and substrate z for a metallic and a dielectric substrate are shown in Fig 2SI. The ratio is also reported for completeness in the inset.

Fig. 3SI presents the topography and relative THz image of the resonant plasmonic antenna device shown in Fig. 5 in the main text, but having the incident E-field polarization perpendicular to the longer axis of

the antenna. Both Figures have been acquired with a QCL repetition rate of 10 kHz. Even though in the THz image it is possible to distinguish the borders between the metallic antenna arms and the surrounding

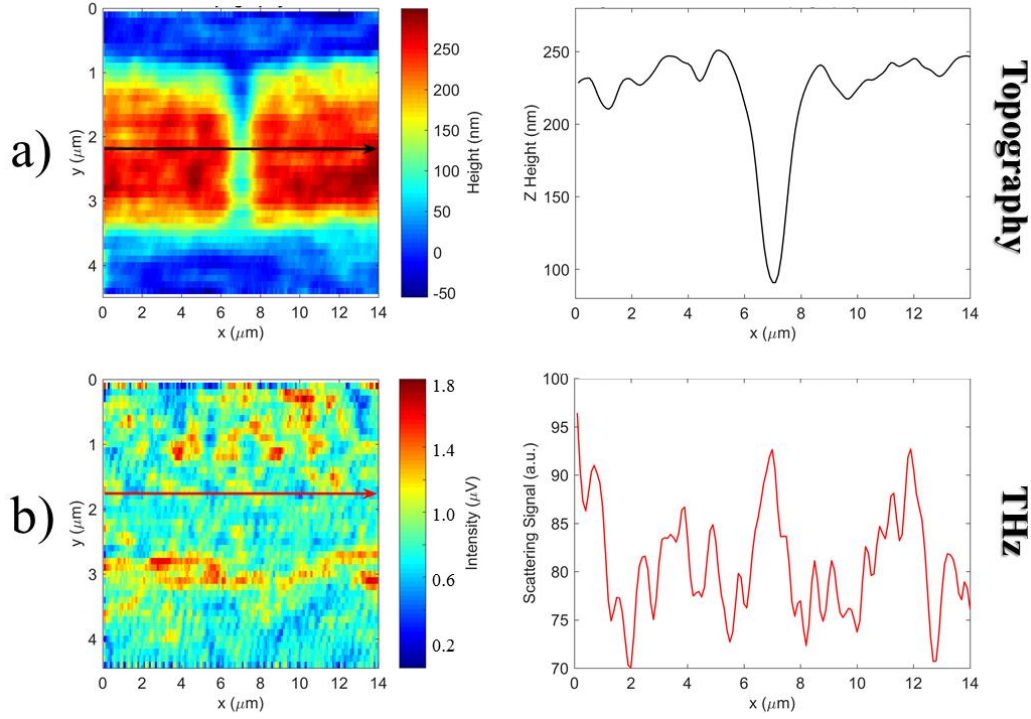


Figure S3. Topography a) and corresponding THz image b) of the antenna device shown in Fig. 5 in the main text. The profiles extracted show that there is no resonance in the gap, as the polarization of the incoming radiation cannot excite the main plasmonic resonance.

dielectric material, there is no E-field enhancement in the gap, in agreement with the simulation performed with Comsol Multiphysics (not shown) which predicts a weak charge accumulation at the border between the metal and the dielectric.