

Supplementary Information

Plasmonic mode conversion in individual tilted 3D nanostructures

Christoph Dreser,^{*a,b} Dominik A. Gollmer,^{a,b} Godofredo Bautista,^c Xiaorun Zang,^c
Dieter P. Kern,^{a,b} Martti Kauranen,^c and Monika Fleischer^{*a,b}

^a*Institute for Applied Physics, University of Tübingen, Auf der Morgenstelle 10, 72076 Tübingen, Germany*

^b*Center for Light-Matter-Interaction, Sensors and Analytics LISA⁺, University of Tübingen, Auf der Morgenstelle 15, 72076 Tübingen, Germany*

^c*Photonics Laboratory, Tampere University, P.O. Box 692, FI-33014 Tampere, Finland*

E-mail: christoph.dreser@uni-tuebingen.de, monika.fleischer@uni-tuebingen.de

Figure S1 Illustration of the different illumination angles

Figure S2 Sketch of the simulation geometry

Figure S3 Exemplary fits of linear extinction measurements

Figure S4 Visual description and derivation of the SHG maps

Figure S5 Simulated SHG scanning microscopy images plotted on a logarithmic scale

Figure S6 Large-scale SEM images of nanocones fabricated with etch and evaporation processes

Figure S7 Histograms of the major axis length and height distribution of the nanocones in Figure S6

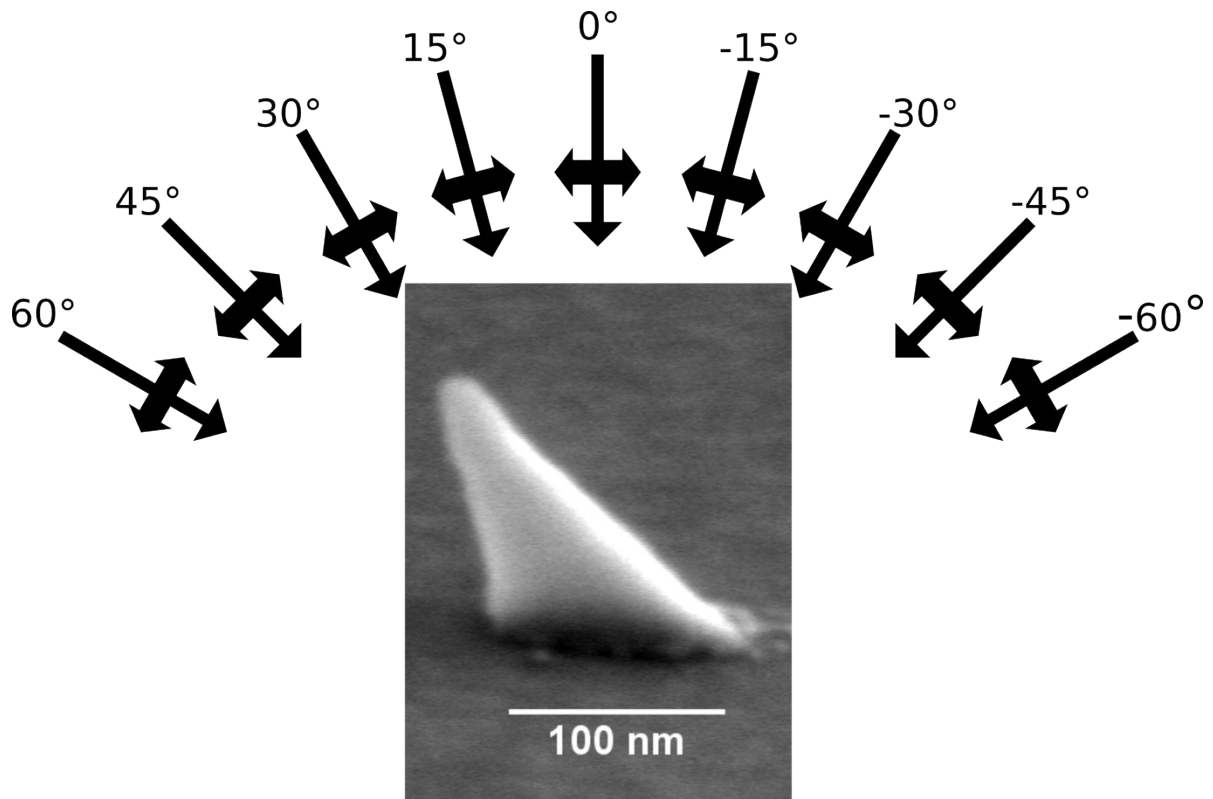


Figure S1 Sketch of the illumination geometry for different angles β .

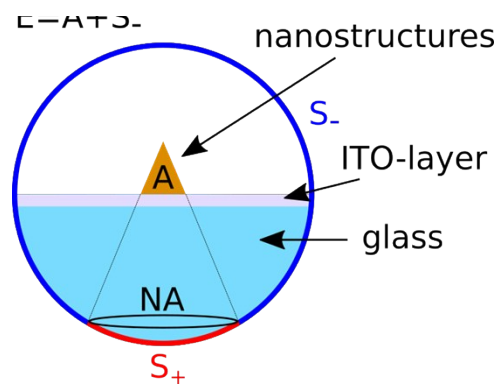


Figure S2 Sketch of the simulation geometry. The extinction is calculated by the absorbed power A plus the power of the light scattered onto the surface S_- , not taking into account the light scattered into the objective (surface S_+). The NA is 0.42 and the diameter of the sphere is $2.8 \mu\text{m}$.

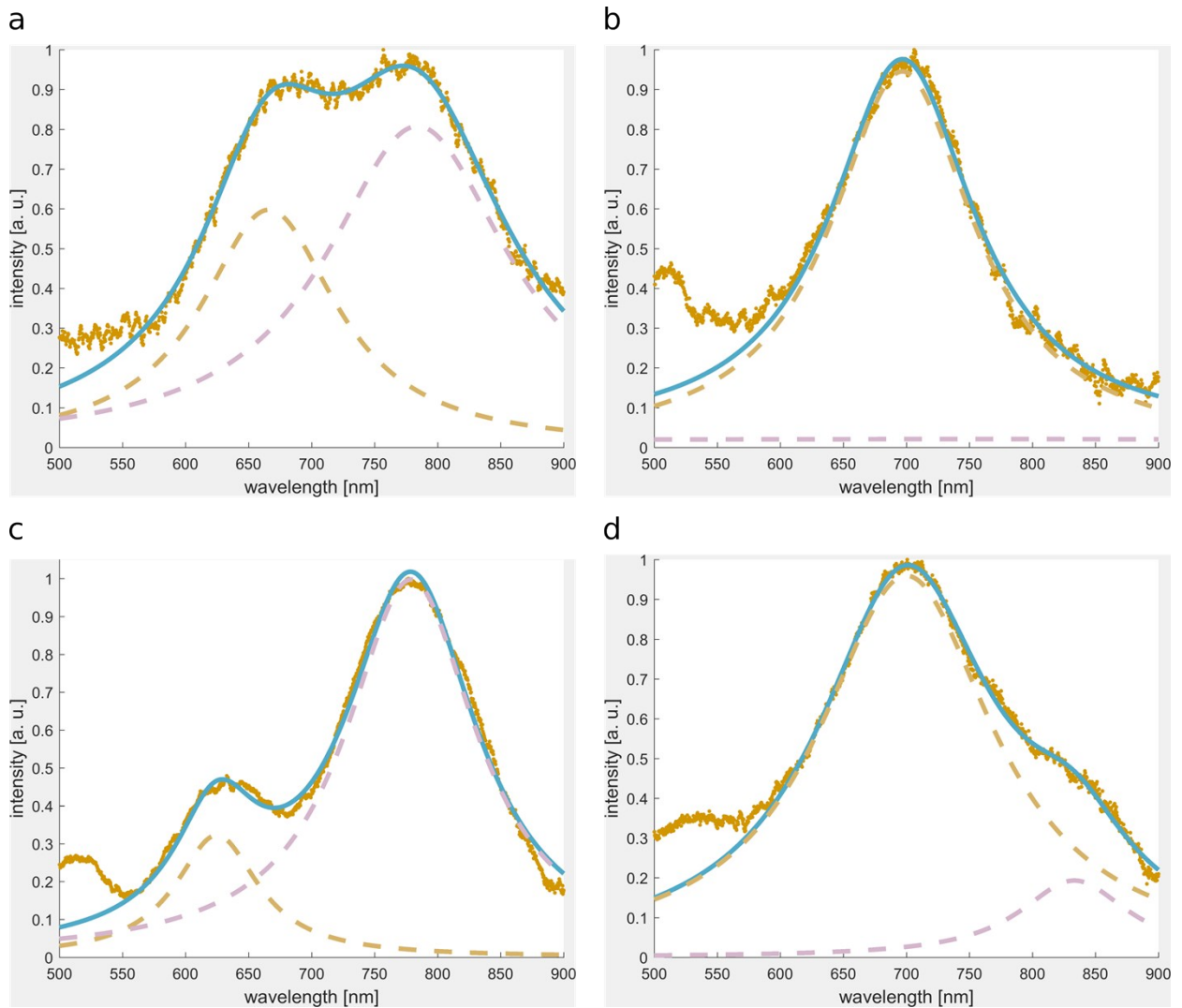


Figure S3 Exemplary fits of some linear extinction measurements from the nanocones. The measurement data is shown as orange dots, the curve-fitted spectrum in light blue, and the single Lorentzians as dashed lines. (a) Straight nanocones under 45° illumination angle. (b) 15° nanocones under 15° illumination angle. (c) 15° nanocones under -60° illumination angle. (d) 30° nanocones under 60° illumination angle.

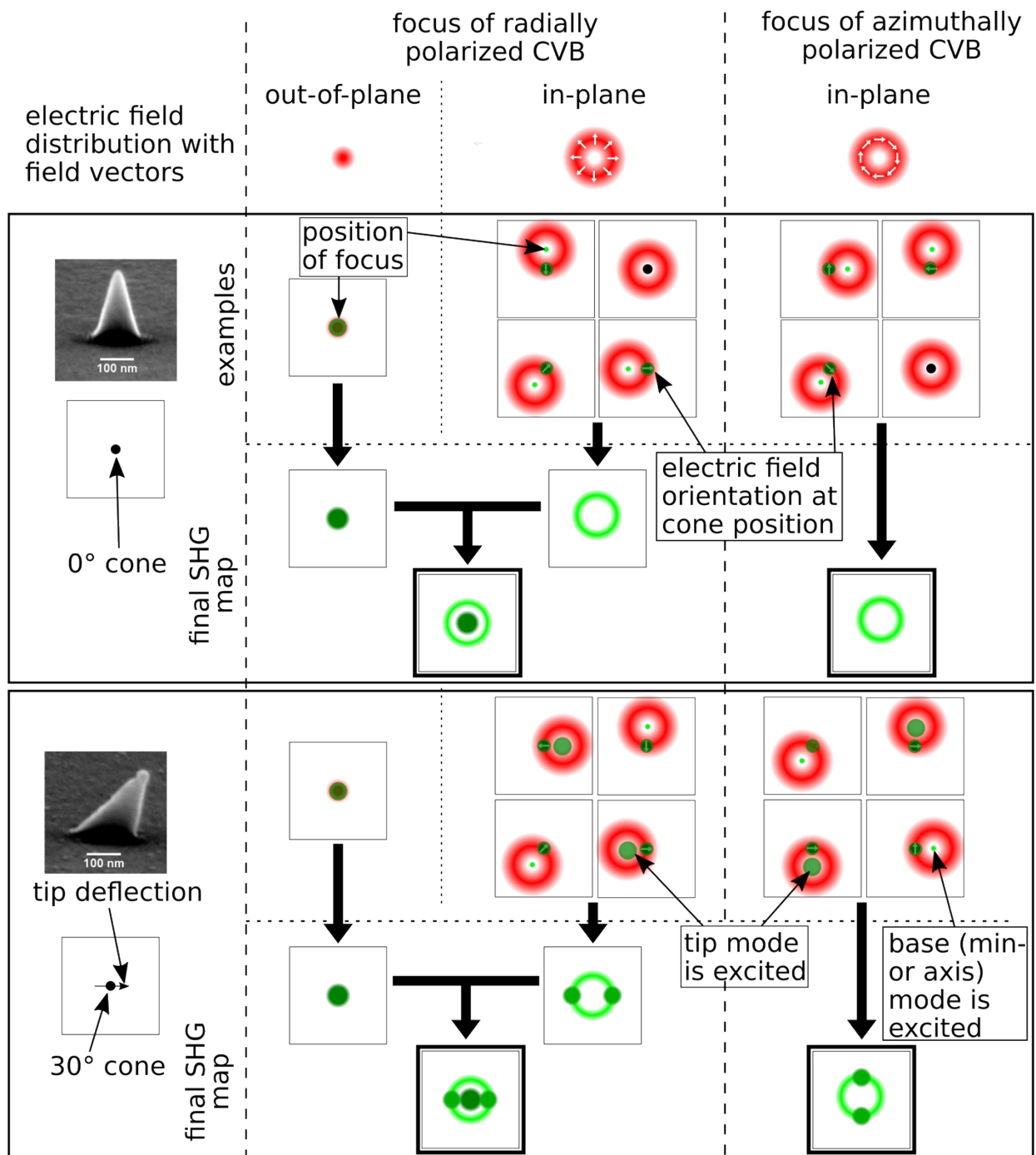


Figure S4 Visual description and derivation of the second harmonic generation (SHG) maps for a straight and a tilted nanocone imaged with focused radially and azimuthally polarized cylindrical vector beams (CVBs).

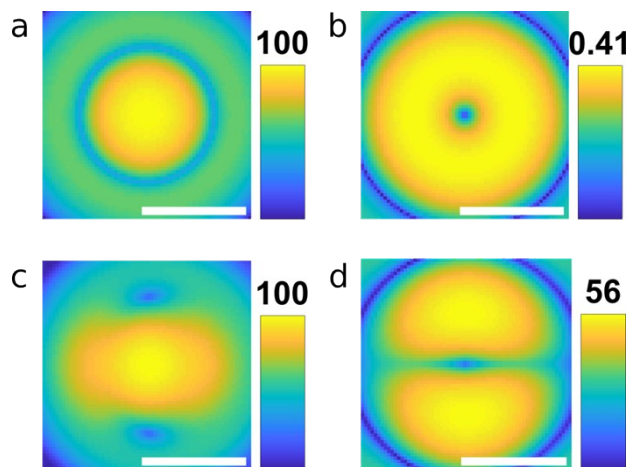


Figure S5 Simulated SHG scanning microscopy images from Figure 11d-h plotted on a logarithmic scale for the straight (a,b) and the tilted (c,d) nanocones, and for radially (a,c) and azimuthally polarized CVBs (b,d). The scale bar is 1 μm .

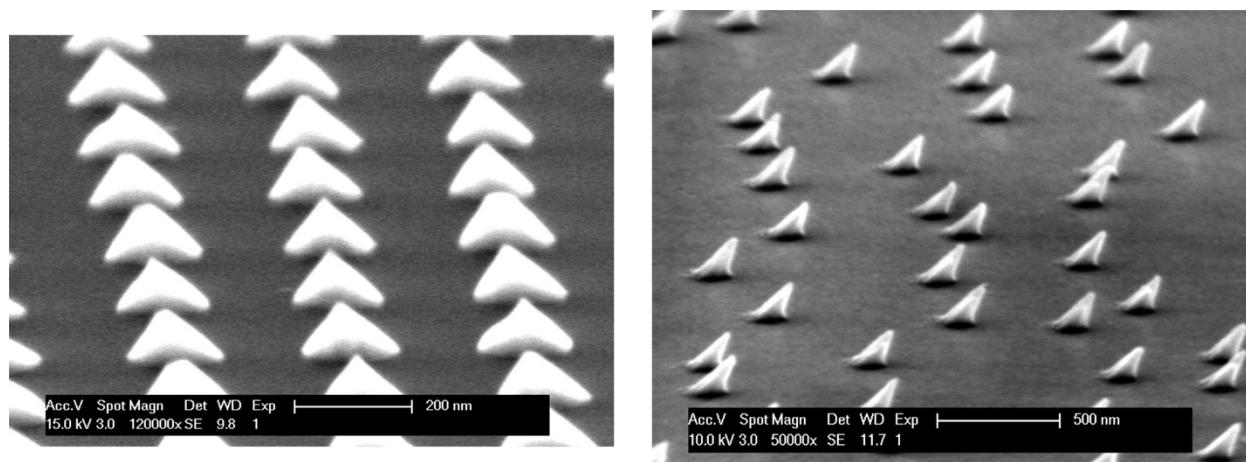


Figure S6 Exemplary large-scale SEM images of fabricated nanocones. Square array of tilted etched nanocones (10°) (left). Field of randomly ordered tilted nanocones (30°) fabricated with the evaporation process (right).

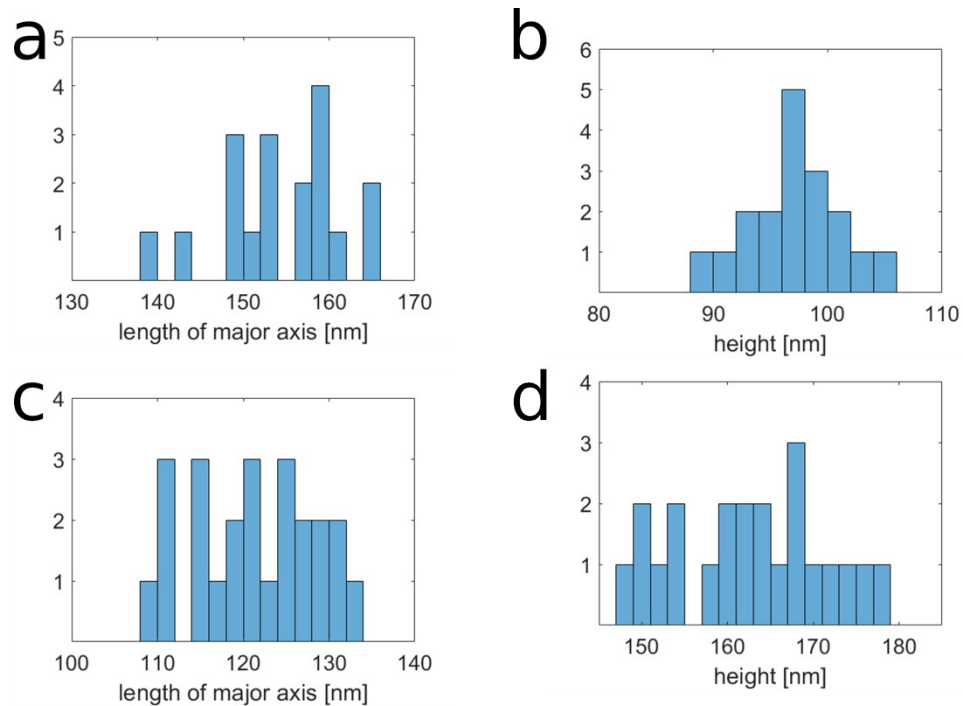


Figure S7 Histograms of the size distributions of the cones displayed in Figure S6. (a) Length of the major axis and (b) height distribution of the etched nanocones. (c) Length of the major axis and (d) height distribution of the evaporated cones. The intervals were chosen to be 2 nm to take the measurement uncertainty into account.