

Supporting Information for: Nanofocusing of Hyperbolic Phonon-Polaritons in a Tapered Boron Nitride Slab

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In this document, we provide three additional figures . Fig S1 illustrates the reflection, transmission and out-of-plane scattering of the fundamental HPP mode propagating along the tapered h-BN slab. Fig. 2S shows the convergence of the numeric simulations for the field enhancement. Fig. 3S illustrates the nanofocusing of HPPs for the taper angle of 8°.

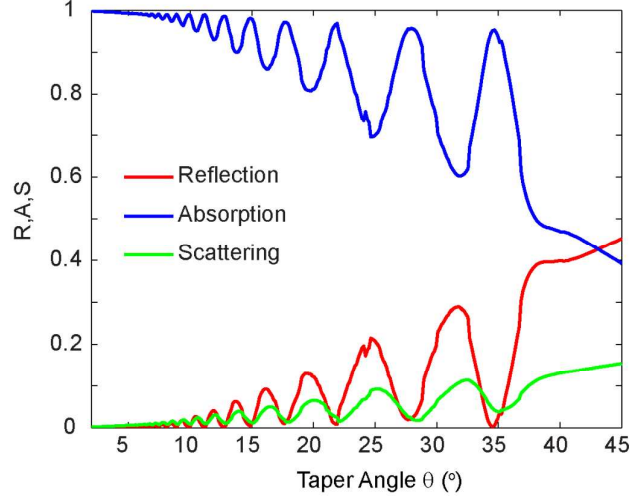


Fig S1. Reflection, R (red curve), absorption, A (blue curve), and out-of-plane scattering, $S=I-A-R$ (green curve), coefficients for the M0 mode propagating along the tapered h-BN film, as a function of the tapering angle, θ . The parameters of the simulation correspond to the tapered h-BN film in Fig. 3a. All three curve show oscillatory behavior (especially for large values of θ) due to the interference caused by the reflections of the higher-order HPP modes (composing the HPP rays) from the taper. These higher-order modes are generated by the sharp corners of the taper, as seen in Fig. 3c.

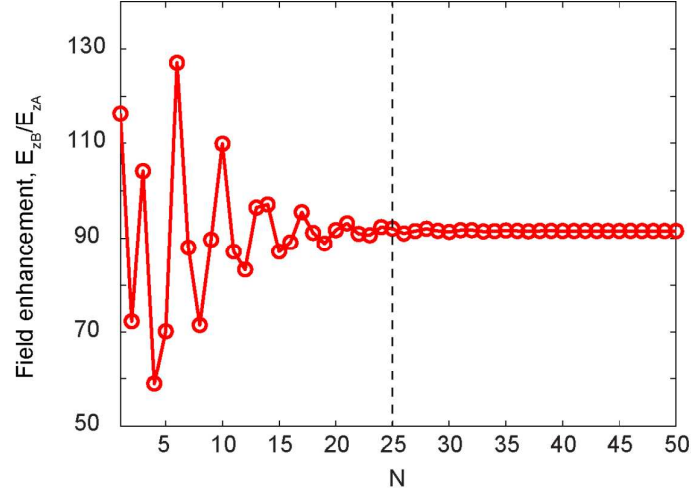


Fig S2. Field enhancement (defined in Fig. 3a), as a function of the mesh discretization, showing convergence. N is related to the maximal size of the mesh elements, Δ , in the h-BN taper region as $\Delta = D/N$, where D presents the reference distance, $D = 50$ nm. The calculation corresponds to the parameters used in Fig. 3a, at the taper angle $\theta = 27.5^\circ$, providing the maximum of the field enhancement. The vertical dashed line indicates the value N corresponding to the mesh used for Fig. 3a, i.e. $\Delta = 2$ nm.

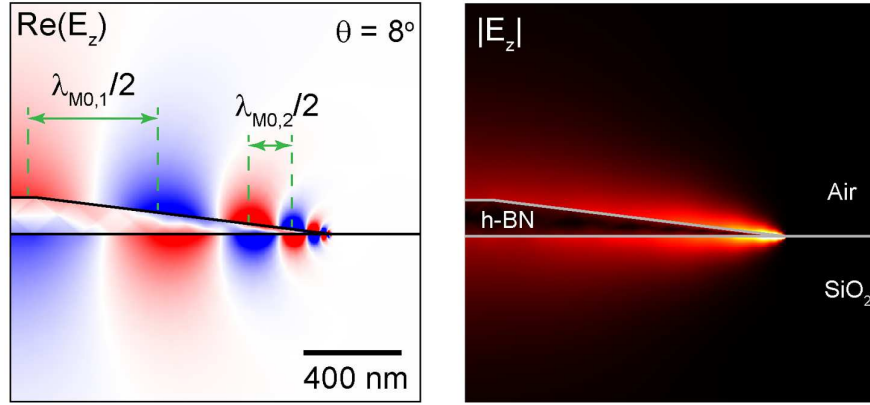


Fig S3. Nanofocusing of HPP accompanying both the field enhancement and wavelength compression. Left and right panels show the spatial distribution of $\text{Re}(E_z)$ and $|E_z|$, respectively. The taper angle $\theta = 8^\circ$. The rest of the parameters is the same as in Fig. 3b,c. In the left panel the green arrows show the difference between the local wavelengths $\lambda_{M0,1}$ and $\lambda_{M0,2}$ of the compressed M0 HPP along the taper.