Nano-optics in 2D materials

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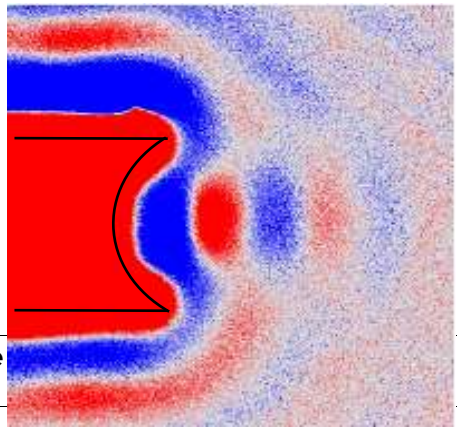
Abstract

The advent of two-dimensional (2D) materials and their extraordinary optical properties has allowed the visualization of nanolight in the form of electrically tunable (active) plasmon polaritons in graphene[1] or low-loss phonon polaritons in h-BN[2] or α-MoO_3[3] thus introducing a very encouraging arena for scientifically ground-breaking discoveries in nano-optics. In this talk I will show our latest studies on the tunability and manipulation of phonon polaritons in hyperbolic van der Waals crystals, which allow for controlling light at the nanoscale (nano-optics) with unprecedented capabilities.

References

[1] Chen, J. et al. Optical nano-imaging of gate-tunable graphene plasmons. Nature 487, 77 (2012).
[2] Dai, S. et al. Tunable Phonon Polaritons in Atomically Thin van der Waals Crystals of Boron Nitride. Science 343, 1125-1129 (2014).
[3] Ma, W. et al. In-plane anisotropic and ultra-low-loss polaritons in a natural van der Waals crystal. Nature 562, 557–562 (2018).

Figures



Figure

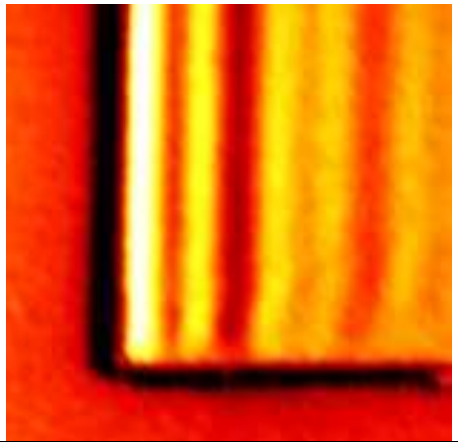


Figure 2: Anisotropic propagation of phonon polaritons in α-MoO_3