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Nonlinear Optical Properties of 2D-Polar Metals

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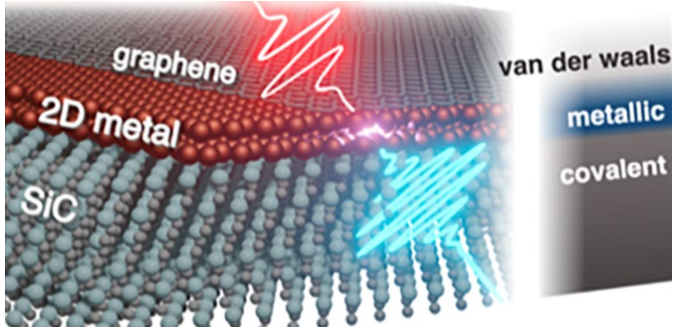
2D-Polar metals are exceptional nonlinear transducers at NIR frequencies important for telecommunications, exhibiting orders of magnitude improvement over other metals and industrial standards.

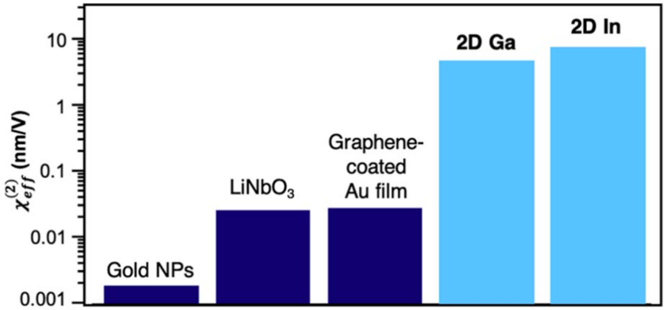
The large nonlinear response results from out-of-plane symmetry breaking reflecting the evolution in bonding character across the heterostructure.

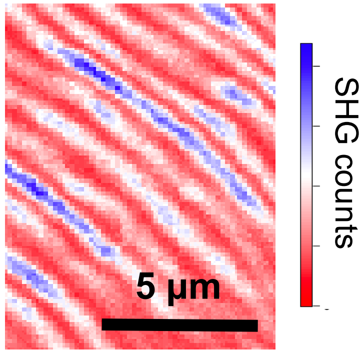
The in-plane symmetry is also important in determining the polarization state of the harmonic, enabling applications based on optical switching.

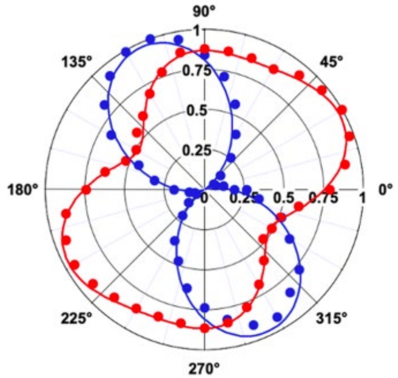
MRSEC-enabled ability to make, model, and measure properties of new materials made record-setting NLO breakthroughs possible



Unique bonding character and axial dipole in 2D-Pmets (above) enable record nonlinear susceptibilities at near-infrared frequencies (below)







Atomic-level changes in metal rotation occurring at substrate steps (bottom) are visible in far-field microscopy (top left) as spatially alternating regions with distinct polar responses (top right).