From Nonlinear Optics to Nonlinear Plasmonics: Giant Nonlinear Polarization Effects in Metamaterials

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We report that engineering of chiral and nonlinear optical properties in plasmonic metamaterial allows the observation of Nonlinear Optical Activity that is millions of times stronger than in natural crystals.

Observation of this giant polarization effect provides a powerful illustration that nanoscale nonlinear plasmonics of metamaterials offers extremely strong effects unfolding in nanoscale volumes of nonlinear medium that could lead to applications in modulation of light intensity and polarization in nanophotonic devices.