Giant enhancement of the transverse magneto-optical Kerr effect through the coupling of epsilon-near-zero and surface plasmon polariton modes

Abstract
We demonstrate a concept for the giant enhancement of the transverse magneto-optical Kerr effect (TMOKE), with amplitudes reaching the maximum theoretical values of +/- 1. The concept exploits the strong electromagnetic field localization in epsilon-near-zero metamaterials to excite surface plasmon resonances with no need of a prism or grating coupler, thus opening routes for magneto-optical devices amenable to miniaturization. A demonstration of the capability of the enhancement mechanism is presented in which giant TMOKE values can be used for sensing and biosensing. (AU)