

Abstract Submitted
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Natural negative refraction index in polycrystalline Fe and Ni at optical frequencies ADIL-GERAI KUSSOW, Dept. of Physics, University of Massachusetts Lowell, ALKIM AKYURTLU, Electrical and Computer Engineering Dept., University of Massachusetts Lowell — Analysis of the photon-magnon interactions in Fe and Ni, 3d transition-metal ferromagnetics, demonstrating the coupling between the incident light and high-frequency spin waves with energy (0.2 – 0.35) eV is presented. As a consequence, these metals in their polycrystalline form with nanoscale grains are found to possess a negative refraction index at optical frequencies, close to the high-frequency ferromagnetic resonance. The effect is due to the coexistence of the spin wave mode with the plasmonic mode, and both modes are activated by the e.m. field of the light, with simultaneous permittivity and permeability responses within some frequency band.

Adil-Gerai Kussow
Dept. of Physics. Univ. Mass. Lowell

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