Ferromagnet/superconductor heterostructures - new type of meta-materials

P. Przysłupski

Institute of Physics, Polish Academy of Sciences, Lotników 32/46, 02-668 Warszawa, Poland

Negative refraction, which reverses many fundamental aspects of classical optics can be obtained with negative magnetic permeability and negative dielectric permittivity. This raport presents new method of realization of systems with negative refraction index at millimeter waves, however at external magnetic field and at temperatures lower than 100 K.

This idea is realized in manganite/cuprate superlattices. For such case the superconducting $YBa_2Cu_3O_7$ (YBCO) layers provide negative permittivity while negative permeability is achieved *via* ferromagnetic $La_{1-x}Sr_xMnO_3$ (LSMO) layers for frequencies and magnetic field close to ferromagnetic resonance. In such YBCO/LSMO superlattices the refractive index can be switched between negative and positive regions by an external magnetic field as a tuning parameter.

Name of the presenting author (invited): Piotr Przysłupski
e-mail address: przys@ifpan.edu.pl
http://www.ifpan.edu.pl