Magnetoelectric effect in magnetostriction-piezoelectric multiferroics

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Abstract: The present stage in the study of magnetoelectric (ME) composite multiferroics is analyzed. The ME effect in materials of this kind is due to the magnetostriction and piezoelectric properties of the components. The elastic mechanical interaction between the magnetostriction and piezoelectric phases engenders a giant magnetoelectric response in magnetoelectric composite materials. The ME effect is more than 100 times stronger near an electromechanical resonance. The recently obtained nanostructural composites made from ferroelectric and magnetic oxides with dimensions of the order of nanometers made in the form of films on a substrate engender interest in the possibility of constructing integrated devices. The ME interaction between ferroelectrics and magnetic oxides with nanometer dimensions is the same as in ordinary composite materials. Just as for bulk ME composites, sensors, transducers and diverse reading/writing devices are some of the possible applications of the ME effect in nanocomposites. © 2010 American Institute of Physics.

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