NONCOLLINEAR SPIN CONFIGURATIONS IN Fe/Si MULTILAYERS

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9.7 cm

Formation of noncollinear spin configurations has been investigated in $(\mathrm{Fe}30\AA/\mathrm{Si}15\AA)\cdot 11$ multilayered films, which were prepared by sequential *dc* sputtering. A single-crystal GaAs plate of (001) orientation was used as substrate. The experiments have been performed using magneto-optical longitudinal Kerr effect at room temperature. The magnetic field was applied in the film plane. The field dependencies of the Kerr rotation had parts with slightly varying rotation. For different directions of magnetic field in the film plane the Kerr curves had different value of F_0/F_s ratio (F_s and F_0 are the Kerr rotation in saturation and in zero magnetic field, respectively). The presence of cubic anisotropy and weak uniaxial anisotropy in the film plane has been demonstrated by the ferromagnetic resonance measurements. The experimental results were analyzed using the theory, which takes into account the competition between the bilinear exchange term, biquadratic exchange term and cubic magnetic anisotropy term. As the analysis shows, the observed features are related to the field-induced phase transition to stable noncollinear structure, which exists as metastable state in the absence of magnetic field.

13.4 cm

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