

## Magnetic anisotropies in ultrathin iron films grown on the surface-reconstructed GaAs substrate

Akta B., Heinrich B., Woltersdorf G., Urban R., Tagirov L., Yldz F., Özdoğan K., Özdemir M., Yağın O., Rameev B.

*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### Abstract

Magnetic anisotropies of epitaxial ultrathin iron films grown on the surface-reconstructed GaAs substrate were studied. Ferromagnetic resonance technique was exploited to determine magnetic parameters of the films in the temperature range of 4-300 K. Extraordinary angular dependence of the FMR spectra was explained by the presence of fourfold and twofold in-plane anisotropies. A strong in-plane uniaxial anisotropy with magnetic hard axis along the [1 1- 0] crystallographic direction is present at the GaAsFe (001) interface while a weak in-plane uniaxial anisotropy for the Fe grown on Au has its easy axis oriented along [1 1- 0]. A linear dependence of the magnetic anisotropies as a function of temperature suggests that the strength of the in-plane uniaxial anisotropy is affected by the magnetoelastic anisotropies and differential thermal expansion of contacting materials. © 2007 American Institute of Physics.

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