INTERVAL IDENTIFICATION OF FMR PARAMETERS FOR SPIN REORIENTATION TRANSITION IN (Ga,Mn)As*

M.W. Gutowski[a], O. Proselkov[a], J. Sadowski[a,b], M. Sawicki[a], R. Żuberek[a]
[a]Institute of Physics, Polish Academy of Sciences, Warszawa, Poland
[b]MAX-lab, Lund University, Lund, Sweden

We report ferromagnetic resonance (FMR) in-plane studies of a 15 nm thick (Ga,Mn)As layer, deposited on (001)-oriented GaAs, in the temperature ranging from 5 K to 120 K. The behavior of the anisotropy fields, H_{eff} ($= 4\pi M - H_{2\perp}$), $H_{2\parallel}$, and $H_{4\parallel}$, has been determined using powerful but still largely unknown interval calculations. We observe the reorientation of an easy axis of the in-plane uniaxial anisotropy ($H_{2\parallel}$) from [$\bar{1}$10] to [110] direction close to the Curie temperature (T_{C}). The orientation of easy axes of biaxial anisotropy ($H_{4\parallel}$) remains unchanged while temperature changes, only its magnitude vanishes at T_{C} as the 4$^{\text{th}}$ power of spontaneous magnetization. In order to exactly examine this reorientation we use the interval calculus. The interval approach allows us to precisely calculate *all* the resonance fields for arbitrarily oriented sample, what is intractable analytically. Using those methods we can effectively utilize full experimental information, and not only those measurements performed in special, distinguished directions, to reliably estimate the values of important physical parameters (as well as their uncertainties and correlations), not limited to anisotropy constants alone.

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13.4 cm

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Corresponding author :
M.W. Gutowski

Address for correspondence :
Instytut Fizyki PAN, ON-3
02–668 Warszawa
Al. Lotników 32/46
Poland

Email address :
gutow@ifpan.edu.pl