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Supplementary Information

Evidence of anomalous switching of the in-plane magnetic easy axis with temperature in Fe_3O_4 film on $SrTiO_3$:Nb by v-MOKE and ferromagnetic resonance

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Measurement of the angular evolution of the resonance linewidth with temperature

The angular evolution of the resonance linewidth at different temperatures is shown in Fig. S1. The same behavior as that shown in Fig. 6 for the resonance field is observed at 295 and 130 K, with maxima along the hard axes (<110> directions). Below the Verwey transition, at 110 K, the linewidth maxima shifts to the <100> directions, i.e. following the hard axis, in good agreement with similar observation done for the angular dependence of the in-plane resonance field (Fig. 6).

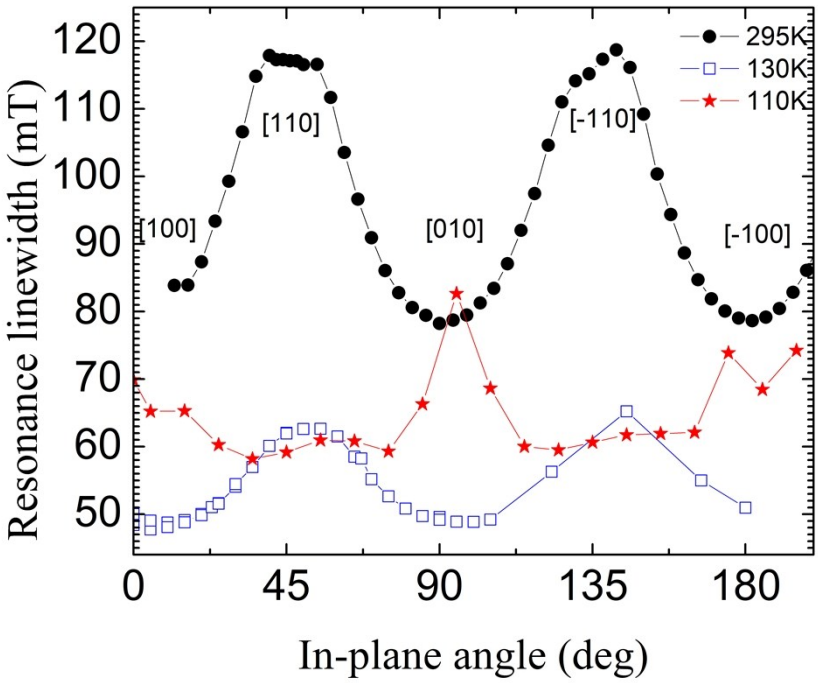

Fig. S1. Angular dependence (0-180º) of the resonance linewidth measured at temperatures above (295 and 130 K) and below (110 K) the Verwey transition temperature of the film under study, T_V = 115 K.