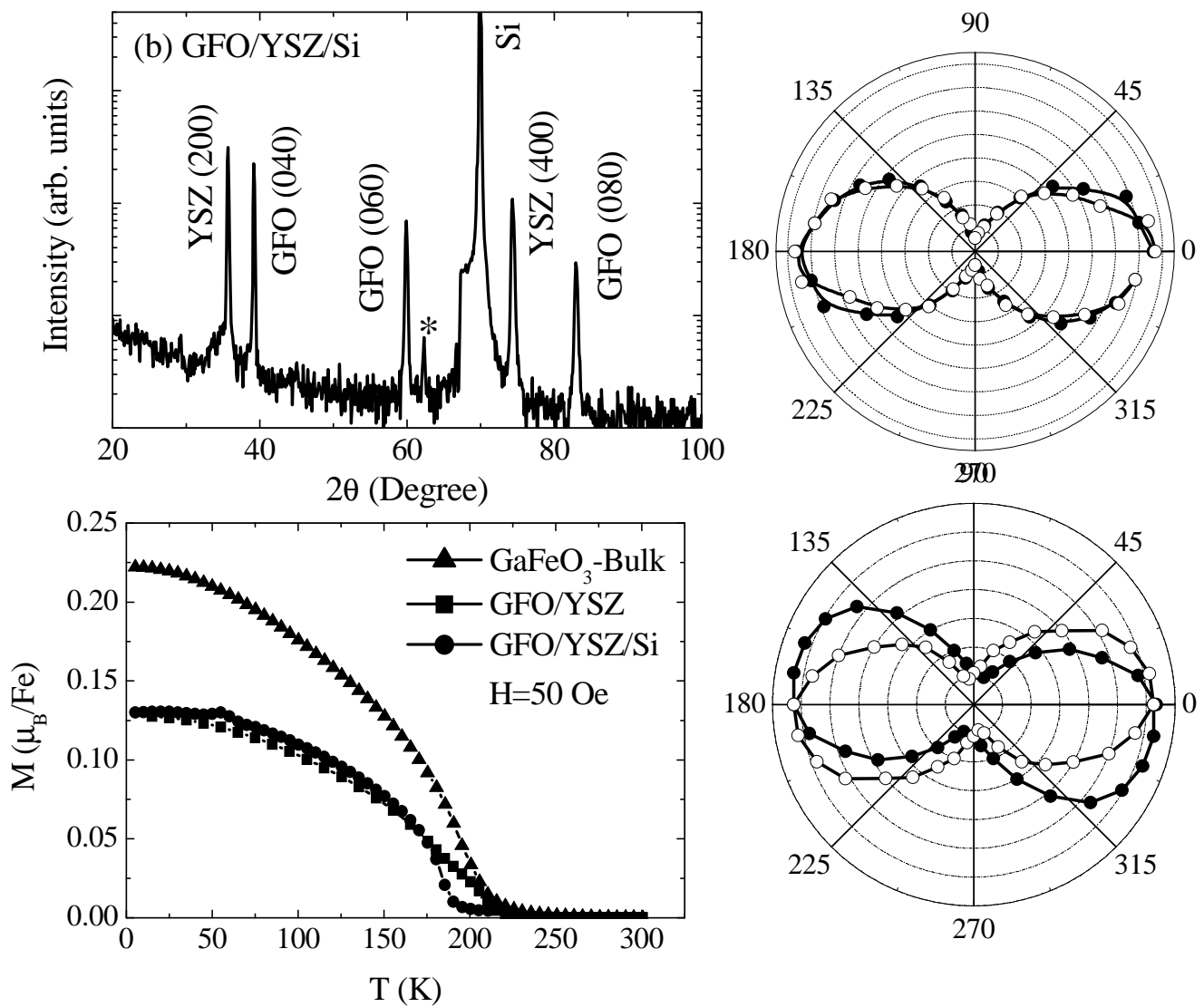


Large Second Harmonic Kerr rotation in GaFeO₃ films on YSZ buffered Si

Epitaxial thin films of gallium iron oxide (GaFeO₃) are grown on (001) silicon by pulsed laser deposition (PLD) using yttrium-stabilized zirconia (YSZ) buffer layer. The crystalline template buffer layer is *in-situ* PLD grown through the step of high temperature stripping of the intrinsic silicon surface oxide.

The X-ray diffraction pattern (top left panel) shows *c*-axis orientation of YSZ and *b*-axis orientation of GaFeO₃ on Si (100) substrate. The ferromagnetic transition temperature ($T_C \sim 215$ K, lower left panel) is in good agreement with the bulk data.

The films show a large nonlinear **second harmonic Kerr rotation of ~ 15 degrees** in the ferromagnetic state. The data of top right panel recorded at room temperature paramagnetic state shows no SH Kerr rotation, while the data of the lower right panel recorded at 100 K (FM state) shows the ~ 15 degrees SH Kerr rotation.



Darshan C. Kundaliya, S. B. Ogale, S. Dhar, K. F. McDonald, E. Knoesel, T. Osedach, S. E. Lofland, S. R. Shinde and T. Venkatesan,
[Journal of Magnetism and Magnetic Materials](#) (submitted)