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**Report:**

Magnetic semiconductors show a rather low Curie temperature making them inapplicable for commercial use. However, GaMnAs seems to be a promising candidate for high Curie temperature material. This can be achieved when GaMnAs is epitaxically grown on GaAs substrates with a limited manganese content of a few percent, as higher Mn contents cause the formation of Mn nanocrystals. Recently, hybrid systems containing GaMnAs show ferromagnetic behavior up to temperatures of 200 K and the rise of the Curie temperature can be correlated with changes of the samples structure and composition. However, a detailed knowledge about the relation between structural properties and magnetism is lacking.

The aim of this high resolution in situ x-ray diffraction study was to investigate lattice distortions in diluted magnetic semiconductor gallium manganese arsenide (GaMnAs) thin films due to magnetostriction. The experiments were performed at XMaS beamline BM28 of ESRF using two different GaMnAs samples consisting of a 50 nm (200 nm) LT(low temperature fabrication)-GaMnAs on top of 2 nm (2 nm) LT-GaAs and 125 nm (120 nm) GaAs buffer grown on a (100) oriented GaAs substrate with a Curie temperature of 118 K (60 K). We measured the GaMnAs (400) Bragg reflection in a temperature range between 30 K and 180 K for both samples. Three temperature series were measured for each sample at an incident photon energy of 15 keV. Subsequently, the wave-vector difference $\Delta q$ between the GaAs reflection (as a reference) and the GaMnAs reflection was determined from the measured diffraction scans to investigate structural changes in the GaMnAs layer when passing the transition temperature. Preliminary results of this analysis and comparison with earlier results measured at beamline BL 9 of DELTA in a limited temperature range are presented in the figure below for the sample with a Curie temperature of 118 K. So far no strong indication of structural signatures of the magnetic transition can be found. Likewise, the 60 K sample does not show a significantly different temperature dependence at first glance. Hence, a more detailed analysis of the whole dataset including modelling of the layer oscillations together with comparison with theory is needed.