ESRF	Experiment title: XRS investigation of multiferroic TbMn₂O₅ in applied electric and magnetic field.	Experiment number: 28 01 754
Beamline:	Date of experiment:	Date of report:
BM28	from: to:	06/05/08
Shifts:	Local contact(s):	Received at ESRF:
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Report:

This proposal which was accepted for beamtime on the XMaS beamline was aimed at the investigation of multiferroic $TbMn_2O_5$. However, shortly before the experiment, we became aware the the group of Professor Peter Hatton at Durham University, UK, were also investigating this compound using XRS techniques. We therefore (sportingly) decided to switch the sample to the DyMn_2O_5 compound. The results from this investigation are already published in:

X-ray resonant diffraction study of multiferroic DyMn₂O₅

<u>R. A. Ewings</u>,¹ <u>A. T. Boothroyd</u>,¹ <u>D. F. McMorrow</u>,² <u>D. Mannix</u>,³ <u>H. C. Walker</u>,² and <u>B. M. R. Wanklyn</u>¹ Physical Review B77 104415 (2008).

X-ray resonant scattering has been used to measure the magnetic order of the Dy ions below 40 K in multiferroic $DyMn_2O_5$. The magnetic order has a complex behavior. There are several different ordering wave vectors, both incommensurate and commensurate, as the temperature is varied. In addition a nonmagnetic signal at twice the wave vector of one of the commensurate signals is observed, the maximum intensity of which occurs at the same temperature as a local maximum in the ferroelectric polarization. Some of the results, which bear resemblance to the behavior of other members of the RMn_2O_5 family of multiferroic materials, may be explained by a theory based on so-called acentric spindensity waves.