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The aim of this experiment was to continue the study of $TmNi_2B_2C$ using non-resonant x-ray diffraction. Our first experiment on this material performed far from resonance [1] suffered badly from the instability of the beam. We conducted a second experiment on resonance [2], which suggested that the induced Tm moment is independent of the volume fraction that is superconducting. There did not seem to be anomalous behaviour around T_C. The data also showed that even on resonance, they were still affected by the beam instability.

As the polariser has proved to considerally reduce the problem of the orbit movement [3], it was decided to perform again the non-resonant experiment hoping to find out if Ni contributes to the ordering of Tm by measuring the magnetic form factors around T_C, and to measure the magnetisation in the superconducting state. The geometry used was the same as described before [1], but this time with also a Si(444) polariser and the diamond phase plate to conditioned the beam.

After aligning the polariser and the phase-plate, we sat on the (330) Bragg reflection at base temperature (1.7K) in the L+S geometry and ran a macro flipping the magnetic field for different values of the diamond offset angle. We immediately found that there were some heating problems cause by the reversal of the magnetic field. We spent the rest of the week playing around with the amplitude of the magnetic field, the sleeping time before each measurement, a different temperatures, changing geometry (L only) and reflection (220). Unfortunately, the magnetic moment was so small (is paramagnetic), that it was impossible to get something reliable.

[1] L. Bouchenoire *et al.* Experimental report 28-01-119 (2001).

[2] L. Bouchenoire *et al.* Experimental report 28-01-138 (2002).

[3] L. Bouchenoire. Thesis (2003).