ESRF	**Experiment title:** Search for magnetic DAFS oscillations in the antiferromagnetic compound $TbNi_2Ge_2$	**Experiment number:** HE-711
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Report:

$TbNi_2Ge_2$ turns out to be a model compound to perform magnetic DAFS experiments, and where for the first time magnetic signal in the extended region has been clearly observed (see fig. 1). The experiment was performed at low temperatures with the sample in an orange cryostat and therefore the scattering plane was horizontal (accesible polarization configurations are $\pi\pi$ and $\pi\sigma$). The energy region of interest for this experiment was beween the L_2 and L_3 edges (7.51 to 8.3 keV), which polarization analysis purposes lies in the optimum region for a pyrolitic graphite PG(0 0 6) reflection. The reflectivity of the analyzer is 10% in a $\sigma\sigma$ configuration. We have measured 2 different specular reflections (0 0 4+q_l) and (0 0 8-q_l), both exhibiting exactly the same features, though the latter one is stronger (20000 cps @ L_3) than the former. The fluorescence signal was monitored and has been used for data normalization. The antiferromagnetic structure of this Ising compound is along the four fold axis, c, and hence one can show that in this case both the dipolar and quadrupolar magnetic signals go to the $\pi\sigma$ channel.

The measured signal can be fitted to the following expression:

$$I(Q_{AF};\hbar\omega) \approx {}^{1}\!/_{\mu(\hbar\omega)} \left| f_{nr} + \hat{f}_{L_2}(\hbar\omega) + \hat{f}_{L_3}(\hbar\omega) + \hat{\chi}_{L_3}(\hbar\omega) \right|^2$$

where all structure factors but f_{nr} are complex tensors. The magnetic DAFS, $\chi_{L3}(h\omega)$, data can be extracted by following an analogous procedure as for EXAFS data. The so-extracted oscillations are shown in fig. 2.

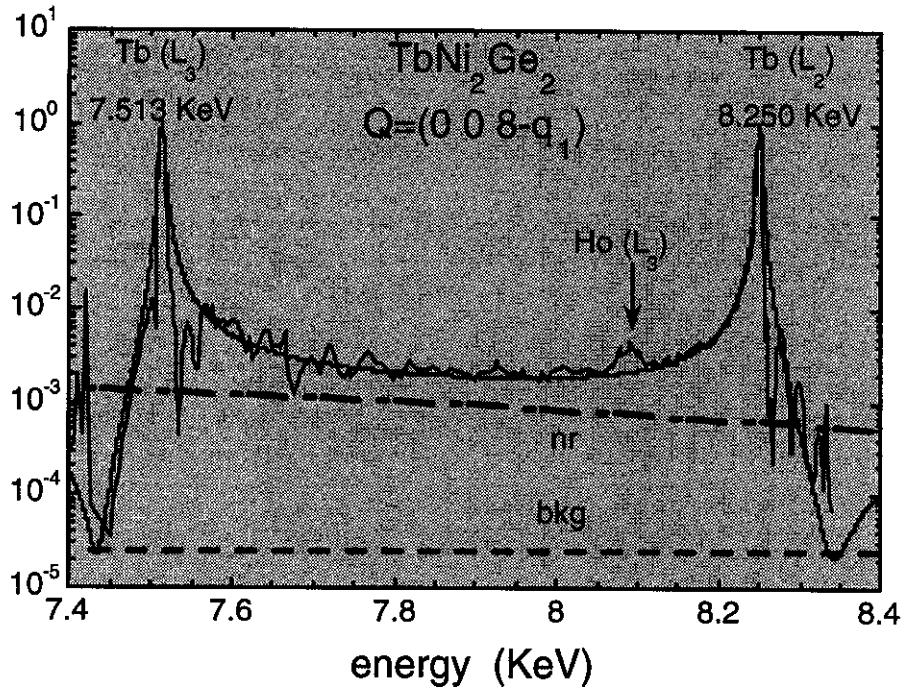

Figure 1. Energy scan at the antiferromagnetic wavevector (0 0 8-q_1) through the L_2 and L_3 edges of Tb. The smooth line is a fit to the equation in the text without considering the oscillating part, $\chi_{L3}(h\omega)$. The small hump at 8.1 keV is attributed to Ho impurities who also order magnetically.

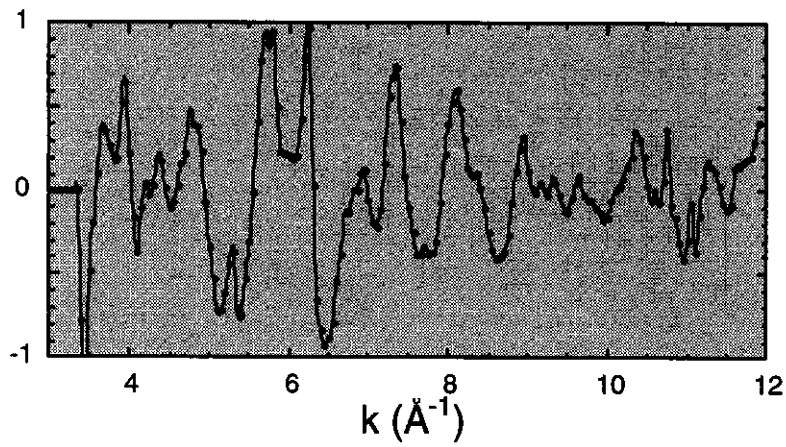

Figure 2. Extracted magnetic DAFS oscillationsfrom the above figure. The vertical scales are k*DAFS_oscillations.