



Experiment title: Azimuthal dependence of the Ga K-edge resonant scattering from UGa_3

Experiment number: HE702

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Report:

UGa_3 has a primitive $AuCu_3$ cubic structure, and orders antiferromagnetically below a Néel temperature of 67K with a magnetic wave-vector of $(\frac{1}{2}\frac{1}{2}\frac{1}{2})$. For this structure, there can exist four wave-vector (K) domains along with three polarisation (S) domains, giving a total of twelve possible magnetic domains. Due to this large number of magnetic domains, the magnetic moments directions cannot be determined from neutron or x-ray scattering.

This experiment was a continuation of experiment HE-595, in which large (apparently magnetic) resonant x-ray scattering was observed at the gallium K-edge of UGa_3 . The goal of this work was to measure the azimuthal dependence of the magnetic satellites, at the K edge resonant energy. This dependence would have enabled us to unambiguously identify if the resonant scattering is indeed magnetic, or from some other anomalous scattering process such as Templeton effects or orbital ordering.

The measured azimuthal dependence at the (1.5 1.5 1.5) magnetic reflection of UGa_3 , at the gallium K-edge, is presented in figure 1. No azimuthal dependence is observed, either because it is not present or because it is masked by the domain effects.

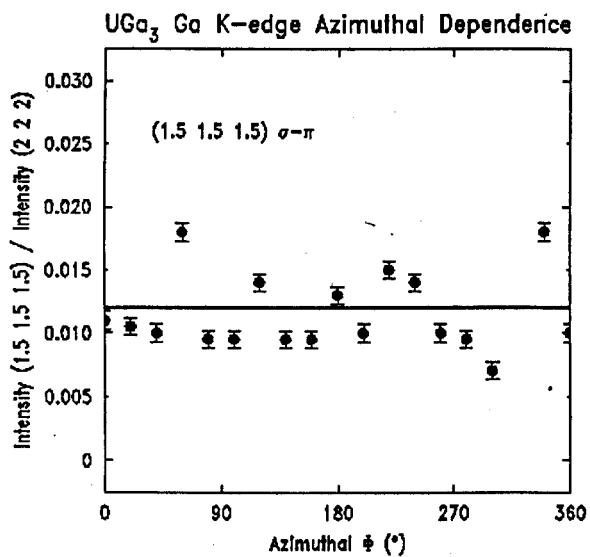


Figure 1. The Azimuthal dependence at the (1.5 1.5 1.5) magnetic reflection of UGa₃.