ESRF	Experiment title: Measurement of inelastic cross-section as a function of the scattering angle	**Experiment number:** **HC-585**
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Report:

The experiment was performed as proposed using 0.1 mm thick samples of polycristalline Cu and Ti and monochromatic radiation 57.8 keV. The high resolution scanning spectrometer was used to measure the intensity of the scattered radiation as a function of the energy for different scattering angles: 20°, W°, 55°, 70°, 90°, 105°, 125°, 145° and 160”. In the forward scattering regime, due to limited space available in the experimental hutch, the spectrometer had to be reconfigured on the optical table. For each scattering angle the table was moved into position to the approximate scattering angle (as defined by a laser beam) and realigned, and for these two reasons the experiment was rather labour intensive. At a scattering angle of 90’ the samples were measured in both reelection and transmission geometry while for smaller angles they were measured in symmetric transmission geometry and for larger angles in symmetric reflection geometry. Monitoring of the incident beam is important because we intend to compare cross sections at different angles. Two monitors were installed, a Si diode in the incident beam and a scintillator which detected radiation scattered at a fixed angle from a 1 mm thick glass slide also placed in the incident beam. Further tests made include data collected at a scattering angle of 90”, using the solid state Ge detector where the primary slits were used to limit the beam below the axis and the secondary slits used to scan the monochromatic beam so as to

measure the polarization profile. Raw data for four different scattering angles and for the two different samples is presented in the figure. The sharp peak is the elastic line, and the broad feature the Compton peak.

The data is now in the process of being analysed, which includes instrument corrections, polarisation effects and corrections for detector linearity background and multiple scattering.

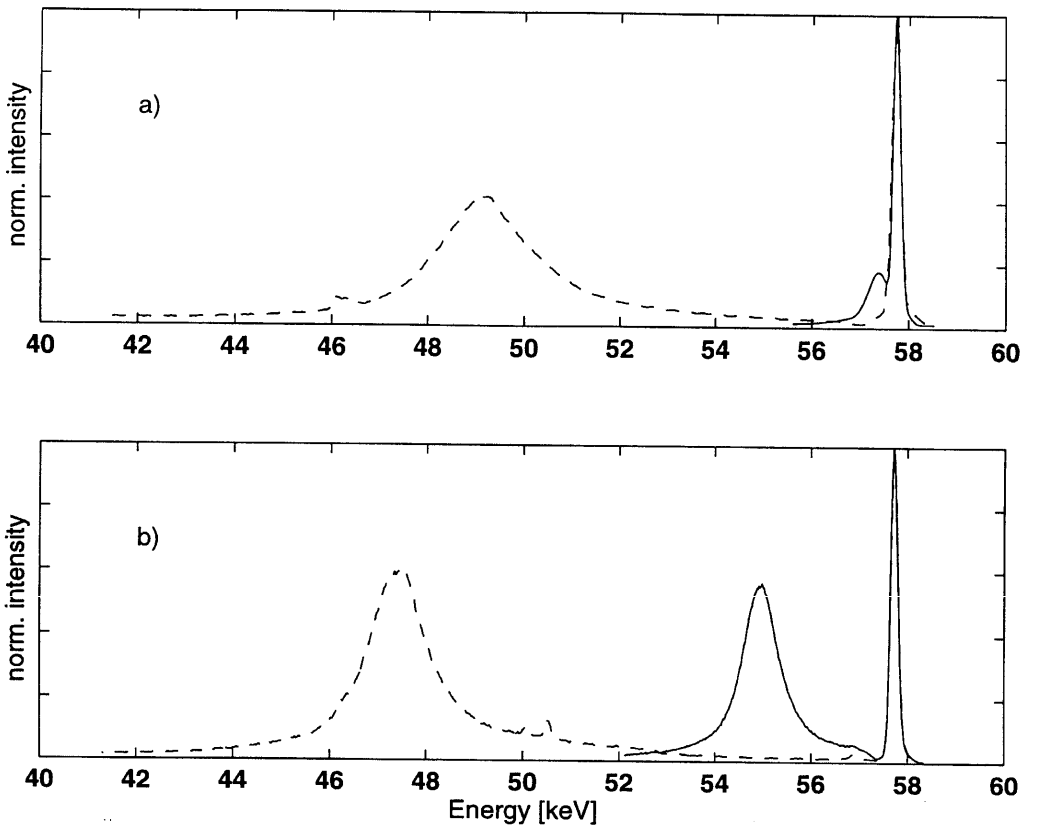

Figure: Measured intensity as a function of energy for different scattering angles. The data has been corrected by the monitor values and normalised to the elastic line maximum:

a) Cu sample at 20° (solid line) and at 125° (broken line). At 20° the Compton peak is just resolved as a shoulder of the elastic line. The structure at 46 keV is a parasite off-equatorial reflection from the analyser

b) Ti sample at 55° (solid line) and 160° (broken line) The small peaks at 50 keV are fluorescence lines from Sn impurities.