ESRF	**Experiment title:** Temperature Dependent magnetic moments and spin density in $Fe_{55}V_{45}$ via magnetic Compton scattering	**Experiment number:** HE 446
Beamline: ID 15A	**Date of experiment:** from: 6/11/98 to: 14/11/98	**Date of report:** 22/2/99
Shifts: 21	**Local contact(s):** V Honkimaki	*Received at ESRF:*

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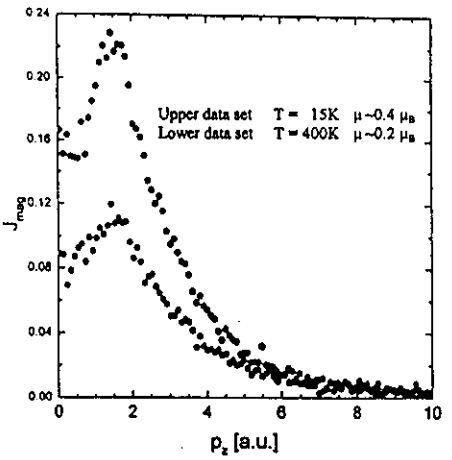
Report: The Fe-V alloy system is considered to exhibit local moment magnetism and the purpose of this study was to determine the contribution of Fe, V and itinerant moments to the total spin moment and to study the variation of the spin density distribution with temperature. This is expected to occur if the exchange splitting is temperature dependent in these disordered alloys.

After the application was approved and the upper temperature of the heater stage was known to be limited to ~ 400 K, it was decided to use the composition $Fe_{45}V_{55}$ rather than $Fe_{55}V_{45}$ because the former has a lower Curie temperature. The measurements were carried out with an incident photon energy of 248 keV and a scattering angle of 167°. Circularly polarised radiation was extracted by the inclined view method and the direction of magnetisation was reversed by using the "Warwick" 1 Tesla rotating magnet. Unfortunately the installation of a multi detector, which would have benefited this project considerably, was delayed until the Spring of 1999.

The results that we obtained are shown in the accompanying figure. The low temperature measurement in which the full spin moment is recorded, shows a typical 3d profile at high momenta with a large central dip which is often regarded as characteristic of a negatively polarised conduction electron density but, as our recent work on Ni showed (JPCM 10 (1998) 2759), it could simply be characteristic of the d-band spin density. However it is clear that the line shape changes at higher temperatures. The 400 K measurement has a much shallower central dip which may indeed indicate that this feature is associated with the changing conduction electron behaviour. Our KKR-CPA code is being revised and developed to model the spin density at this composition and we expect that process to be completed in the next couple of months.

Spin Density in Disordered $Fe_{45}V_{55}$: the Magnetic Compton Profiles



Unfortunately the statistical accuracy possible using the one SSD detector within the 21 shift allocation, some of which has to be used for calibration measurements on an Fe sample, was insufficient to define these changes adequately, for a quantitative comparison with the predictions of the disordered local moment theory. We shall reapply to repeat this study at other temperatures with the new 13 element detector which enchances the prospects for systematic studies enormously. If it had been available for this study the experimental errors would have been reduced by ~ $\sqrt{13}$ and this would have formed the basis for a very interesting quantitative comparison with our model calculations.