ESRF	**Experiment title:** High resolution Compton scattering studies of $Nb_{0.5}Mo_{0.5}$	**Experiment number:** HE 272
Beamline: ID15	**Date of Experiment:** from: 10 Dec 1997 to: 18 Dec 1997	**Date of Report:** 16 February 1998
Shifts: 21	**Local contact(s):** A Shukla	*Received at ESRF :* 23 FEV. 1998

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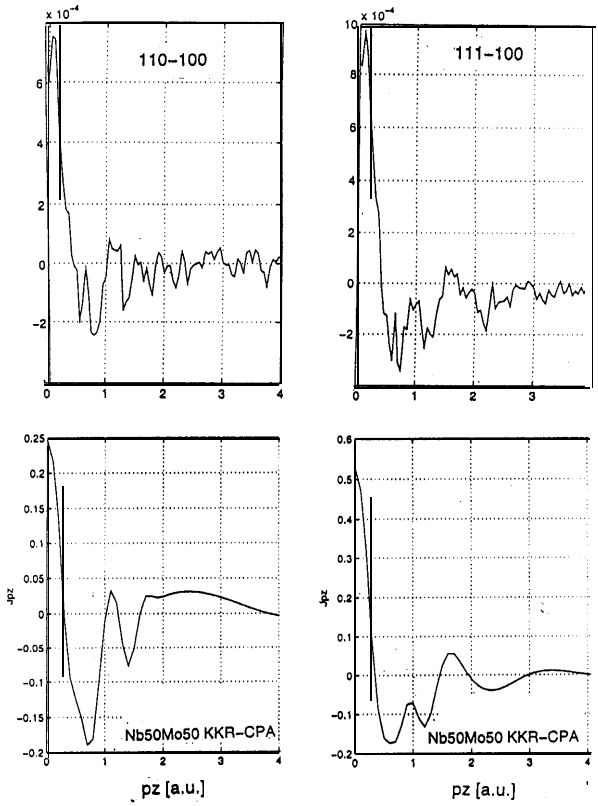
Report:

These experiments were carried out in order to study both the electron momentum density and the Fermi surface topology in this alloy. The structural disorder precludes the use of traditional Fermiology probes and may distort the positron results from 2D-ACAR (angular correlation of annihilation radiation).

The single crystal sample was studied at 55.82 keV, the scattering angle was 157° and the resulting momentum space resolution was 0.17 a.u. (At the Compton peak energy). The single crystal was grown along the [110] direction and (100), (110) and (111) were prepared with identical geometry (and therefore identical multiple scattering and absorption corrections). Multiple scattering as calculated using the algorithm developed at ESRF for this application by Farardo et al (NIM in press 1998) was found to be negligible (~ 0.2%).

The five directional profiles [100], [110], [111], [122] and [221] were measured, the last two in asymmetric reflection geometry from the [110] and [111] slices. In addition the [100], [110], and [111] directional profiles were also measured in molybdenum in order to understand the effect of alloying on the Fermi surface topology. Between 2 and 3 shifts were allocated to data collection for each measurement, typically 20 spectrometer scans were made across the momentum range -9 a.u. to +9 a.u. The directional anisotropies at low momenta in these materials amount to several percent of the Compton peak height and the statistical errors are over an order of magnitude smaller. The data are still being analysed.

At the moment we have only been able to compare some directional profiles with predictions from KKR CPA calculations. The oscillations in the directional difference profiles are broadly consistent with the expected Fermi surface topology as predicted by the band calculations, but we still have to reconstruct the two-dimensional momentum density functions $n(p_x, p_y)$ as well as the Fermi function, n(k).



The accompanying figure shows some of the directional difference profiles at an early stage in the analysis.