

ESRF

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**Experiment title:** Spin resolved resonant photoemission on Ce compounds

**Experiment number:**  
HE-439

**Beamline:**

ID12B

**Date of Experiment:**

from: 10/12-98

to: 15/12-98

**Date of Report:**

28/2-99

**Shifts:**

15

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*Received at ESRF:*

02 MAR. 1999

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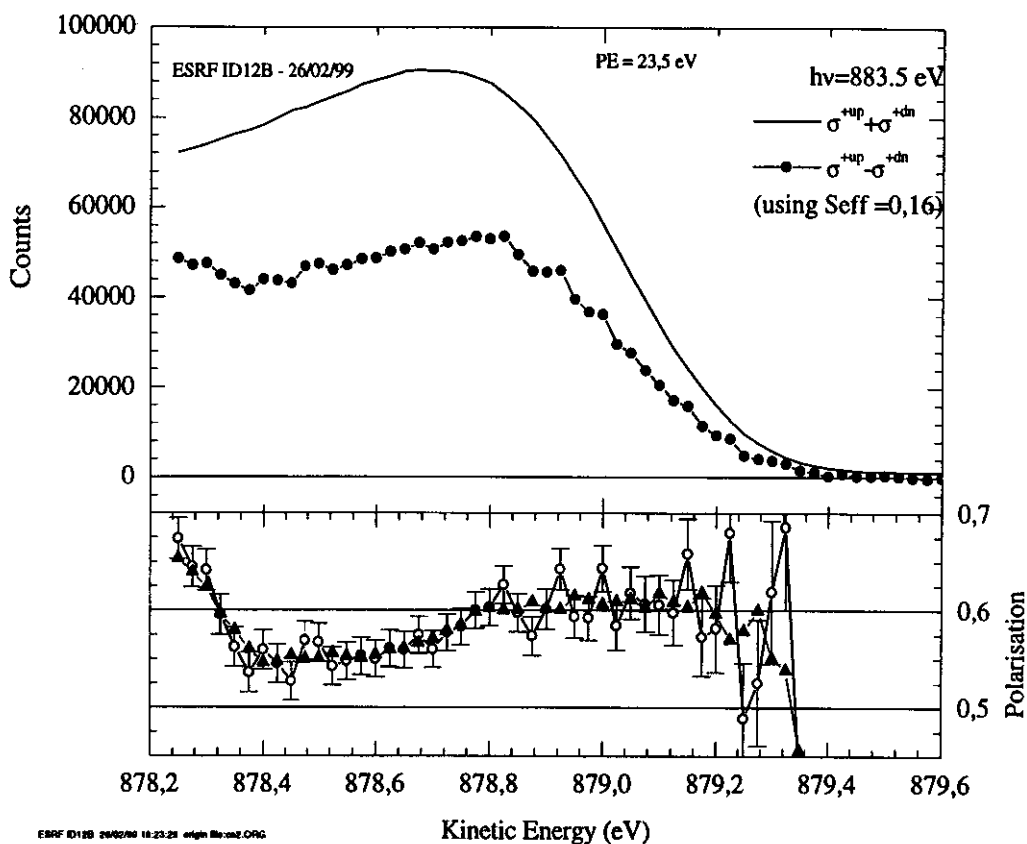
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**Report:**

The aim of the experiment was to measure the spin resolved valence band spectrum of Ce compounds on the 3d resonance. It was hoped that the Kondo peak and its spin orbit replica could be resolved and that a spin polarisation from these features could be deduced. The figure below shows a large collection of Ce valence band spectra collected with the photon energy tuned to the Ce  $M_5$  absorption edge. The upper part of the figure shows the sum of both spin channels (continuous line) and the difference (diamonds), while the lower part shows the degree of polarisation (circles) and the five point average (triangles). As seen from the figure, the polarisation of the emitted photoelectrons is high throughout the valence band with a maximum of approximately 70% at the highest binding energy. There is also a significant change in the polarisation as the energy is varied across the valence band and specifically there is a minimum in polarisation at  $\approx 0.3$  eV below the valence band maximum.



This change in polarisation might be related to the spin orbit replica of the Kondo peak. The energy resolution used in the measurement shown in the figure was  $\approx 400$  meV and the spin polarisation resolution thus even better. Unfortunately the resolution itself was not the limiting factor in the experiment but rather the energy stability of the analyser. Severe drifts in energy limited the use of higher resolution and made the measurements very difficult. Despite this, it is clear that a polarisation change occurs in the vicinity of the energy where the spin orbit replica of the Kondo peak is expected. A detailed analysis is under way, to determine the degree of polarisation that can be expected from different theoretical models. This first result is, however, encouraging and it would be interesting to do further measurements to improve the resolution and statistics as well as to see the temperature dependence.