ESRF	**Experiment title:** Circular dichroism in the angular distribution of photoelectrons from oriented molecules	**Experiment number:** CH-167 HE-25
Beamline: ID 12b	**Date of Experiment:** from: 13/02/1996 to: 28/02/1996 1 l/12/1996 17/12/1996	**Date of Report:** 0l/03/97
Shifts: 15 16	**Local contact(s):** Nick Brookes	*Received at ESRF :* 1 0 MAR. 1997

Names and affiliations of applicants (*indicates experimentalists):

Report:

The project "circular dichroism in the angular distribution of photoelectrons from oriented molecules" started in 1995 entering a completely new field in molecular photoionization. The first results were reported in the ESRF Highlights 1994/95. The same experimental set was subsequently used for experiments with linearly polarized radiation at HASYLAB in Hamburg, the results being just published. Both experiments however showed the necessity to improve our count rate substantially in order to achieve statistically significant results in reasonable times, in particular if systematic studies along photon energy were considered.

For this purpose we applied for two subsequent beamtimes at the ESRF. In the first beam time we proved the proper operation of our new system, whereas during the second beam time in December 1996 we were able to obtain first experimental results. The count rate for the angle resolved electron-ion coincidences was 50

times larger compared to the first experiment of the same kind in 1995. Figure 1 shows such a coincidence spectrum taken at a photon energy of $h\nu$ = 546 eV. Figure 2 shows the first coincident angular distribution of the 0(1 s) phtotoelectron of O_2 taken with circularly polarized light. The difference between such two coincident angular distributions gives the circular dichroism being studied. The data analysis for this quantity is still under work as well as first calculations of this effect using the multiple scattering method.

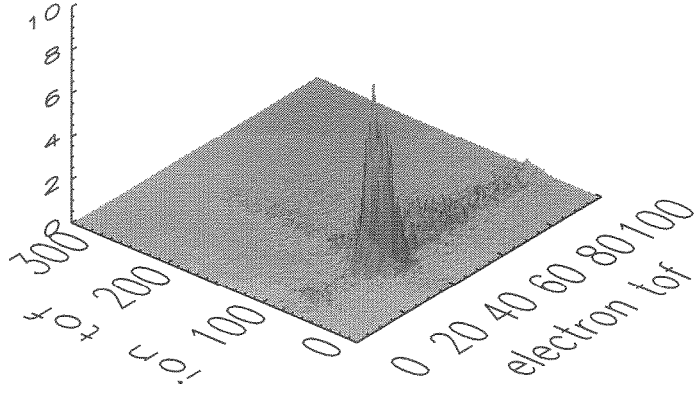

Fig. 1: Electron-ion coincidence map of O_2 at 546 eV photon energy. All events are stored together with their corresponding positions on the anode of the detector. From this information all parameters can be extracted to calculate energy and momentum of each pair of coincident particles.

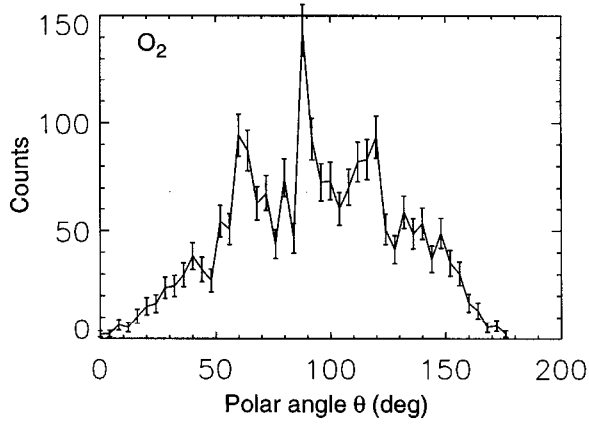

Fig.2: O(ls) phtotoelectron angular distribution of O_2 taken in coincidence with one selected O^+ fragment-ion direction. The spectrum was taken at 546 eV photon energy using left-handed circular polarized light.