



ESRF

Experiment title:

DAFS of semiconductors

Experiment number:

HC 97

Beamline:

D1  
Sw-Nor CRG

Date of Experiment:

from: to:

Date of Report:

29 Aug 95

Shifts:

6

Local contact(s):

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### Report:

Diffraction Anomalous Fine Structure Measures on Layered Semiconductors.

We performed successfully the first attempt to understand the feasibility of a DAFS experiment on the Swiss-Norwegian beam line, where are available, at the same time, a monochromator and a four circle diffractometer. The aim was to record DAFS data of nominally lattice matched InGaP/GaAs epitaxially grown, and presenting a cationic ordering along the  $\langle 111 \rangle$  direction. In this case a Bragg peak of the  $-5/2 \ 5/2 \ -5/2$  reflection is present and structural data can be extracted exactly for the layer in the ordered situation.

Our set of sample was already well characterized by High Resolution X-ray Diffraction, and this made us confident in the orientation of the samples.

The experimental  $\theta$  refers to two samples grown on GaAs substrates with  $0^\circ$  miscut (FIG. 1A and 1B) and  $6^\circ$  miscut (FIG. 2A and 2B) with respect to the (001) direction are reported in the figures. In FIG. 1B the 3D plot in energy from 10232 eV to 10548 eV (Ga K-edge 10367 eV) at fixed q Bragg for the epilayer from the 004 reflection.

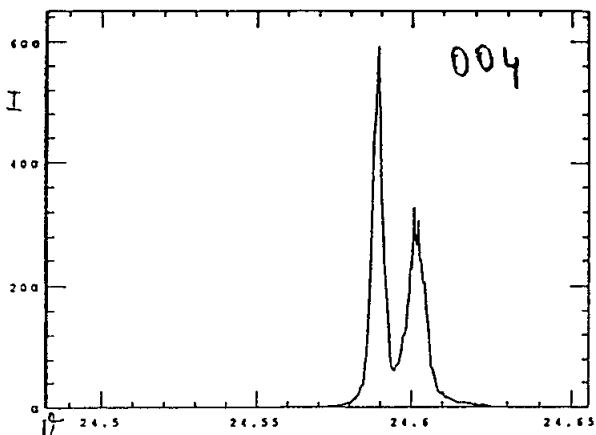
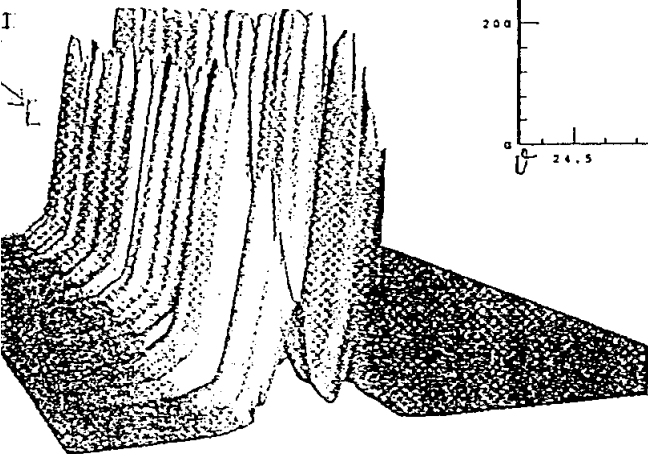
In FIG. 2A is reported the  $-5/2 \ 5/2 \ -5/2$  reflection for the sample grown on GaAs with  $6^\circ$  miscut. and the relative energy scan in FIG. 2B.

The data insufficient for a complete analysis, demonstrate both that it is possible to extract structural data for the epilayer with DAFS on our system, and the feasibility of the experiment on the Swiss-Norwegian Beam line, even in the very time consuming manual mode. Only the invaluable help of dr. Edgar Weckert put us in condition to complete these two sets of measures.

If it will be possible to record data in a partially automated mode, we will undertake a complete study.

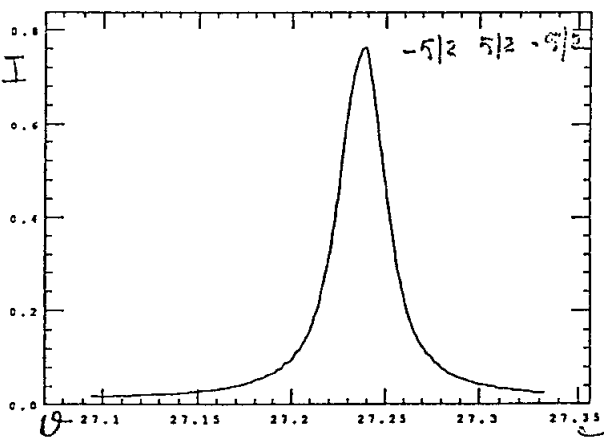
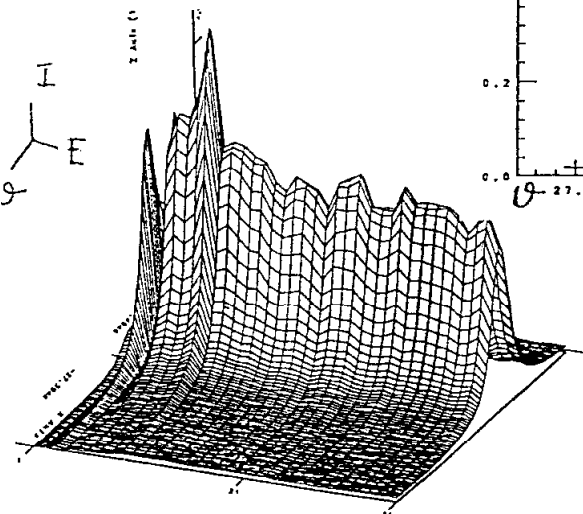
are now sufficient for a complete analysis that is under way. It is already

FIG. 1A  
→



← FIG. 1B

FIG. 2A  
→



← FIG. 2B