EUROPEAN **S**YNCHROTRON **R**ADIATION **F**ACILITY

INSTALLATION EUROPEENNE DE RAYONNEMENT SYNCHROTRON

Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office using the **Electronic Report Submission Application:**

http://193.49.43.2:8080/smis/servlet/UserUtils?start

Reports supporting requests for additional beam time

Reports can now be submitted independently of new proposals – it is necessary simply to indicate the number of the report(s) supporting a new proposal on the proposal form.

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Deadlines for submission of Experimental Reports

- 1st March for experiments carried out up until June of the previous year;
- 1st September for experiments carried out up until January of the same year.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report, in English.
- include the reference number of the proposal to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.

ESRF	**Experiment title:** **Sub 100 nm resolution large area ZPs for 3 KeV X-rays**	**Experiment number**: MI495
Beamline:	**Date of experiment**: from:22/02/01 to:25/02/01	**Date of report**: 02/03/01
Shifts:	**Local contact(s)**: J. Susini	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

M. T. Browne *

Report

This is an interim report, as there has been little time for detailed analysis of the resuls, which finished only 5 days ago. A more detailed report will be submited at a later date.

The first impression is that the experiment was very successful, with very encouraging resulds. All tests were carried out at 3.3 KeV.

We managed to test more than ten ZPs, of two different varieties; The first wariety was of completely speculative design, with the Gold as the zone material. An array of four ZPs was constructed on the same substrate, with slightly different line:groove ratios in the lithography stage. The ZPs were then overcoated with gold, through a combination of sputtering and electroplating. The diffraction efficiencies recorded were rather low, ranging from 0.5% to 1.5% both in first and second diffraction orders. This is quite encouraging, because the ZPs had outer zones of 80 nm, effectively 40 nm in 2nd order. The aim for the future is to compensate for the low efficiency, by increasing the area of the ZPs

We also tested a number of “traditioal” Tungsten ZPs. The highest efficiency recorded Was 12.5% for a 200 micron diameter, 200 nm outermost zone width ZP.

The best ZP tested was 300 micron dia. 100 nm drn.