

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.



	Experiment title: Testing of refractive lenses with minimized absorption	Experiment number: MI-653
Beamline: BM05	Date of experiment: from: 2003-12-03 to: 2003-12-07	Date of report: 2005-08-30
Shifts: 12	Local contact(s): Joanna Hoszowska	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Björn CEDERSTRÖM* Carolina RIBBING*		

Report:

Abstract

A Fresnel-like X-ray lens can be constructed by a triangular array of identical prisms whose base corresponds to the 2π -shift length. Each column of prisms is progressively shifted from the optical axis by an arbitrary fraction of the prism height. Similarly to the multi-prism lens, quasi-parabolic profiles are formed by a superposition of straight-line segments. The resulting projected lens profile is approximately linear with a Fresnel-lens pattern superimposed on it to provide the focusing. This geometry exhibits a significantly larger effective aperture than conventional parabolic refractive lenses. Prototype lenses were fabricated by deep reactive ion etching of silicon. These one-dimensionally focusing lenses were tested at a synchrotron beamline and provided focal line-widths down to $1.4 \mu\text{m}$ FWHM and an intensity gain of 39 at a photon energy of 13.4 keV. Fabrication imperfections gave rise to unwanted interference effects resulting in several intensity maxima in the focal plane. The presented design allows the focal length to be shortened without decreasing the feature size of the lens. Furthermore, this feature size does not limit the resolution as for real Fresnel optics.

From:

B. Cederström *et al.*, "Generalized prism array lenses for hard x-rays", *J. Synchrotron Rad.* (2005). **12**, 340–344