EUROPEAN SYNCHROTRON RADIATION FACILITY

INSTALLATION EUROPEENNE DE RAYONNEMENT SYNCHROTRON

ESRF

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: Holographic study of the local atomic order in ThAsSe and LaSrMnO3**	**Experiment number**: HS-2097
Beamline: ID 22	**Date of experiment**: from: 02.07.2003 to: 05.07.2003	**Date of report**: 10.02.2004.
Shifts: 9	**Local contact(s)**: Dr. Alexandre Simionovici	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

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Report:

We intended to carry out two series of holographic experiments: (i) we planed to study the change of the local order in the CMR material LaSrMnO3 caused by the temperature.
(ii) we intended to extend our previous data on the ThAsSe Kondo type sample, in order to get a more deffinite picture on structural characteristics governing the Kondo behaviour.
Although we collected useful data in the full beamtime period, we could carry out only the first series of experiments. The cause of this is the less then expected fluorescent signal. Since the holographic method is not a standard technique the estimation of intensities are not very precise. We got about half of the countrate we expected. Therefore we decided to measure longer on one sample and postpone the other series of measurement.
We collected holograms on the LaSr MnO3 sample at three temperatures (room 150 ^{o}C and 250 ^{o}C), at three energies at room and 250 ^{o}C and at one energy at the intermediat temperature. The data are good quality, however it would have been useful to take holograms at more energies, as it turned out during the evaluation procedure. The effect (the Jahn-Teller distorsion) is so small that more accurate data is necessary to give a deffinite picture of the changes caused by the temperature. On fig. 1. we show a typical hologram at a single energy for illustration. On fig 2. the reconstructed atomic environments in 3D are shown at low and high temperatures. As the figures show even

these data give useful information on the Jahn-Teller distrosion. Beside planning more precise measurements, we are working on a more detailed evaluation, and a paper is under preparation.

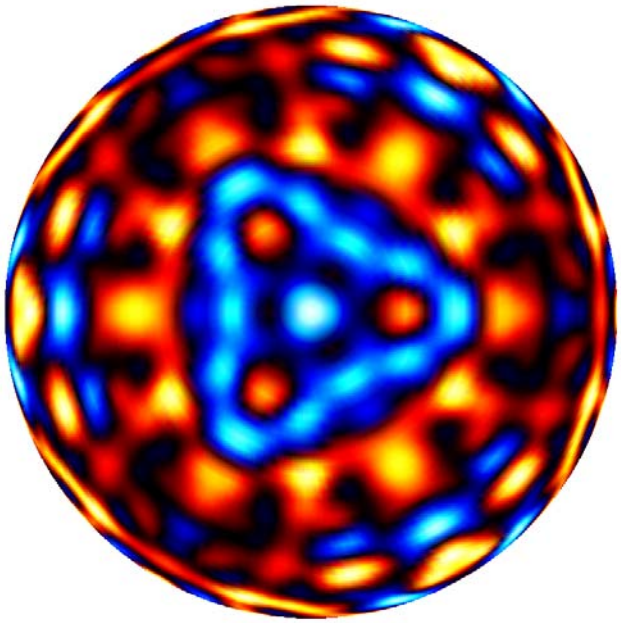

Fig.1. Hologram of the SrLaMnO3 sample taken at 9 keV and at room temperature.

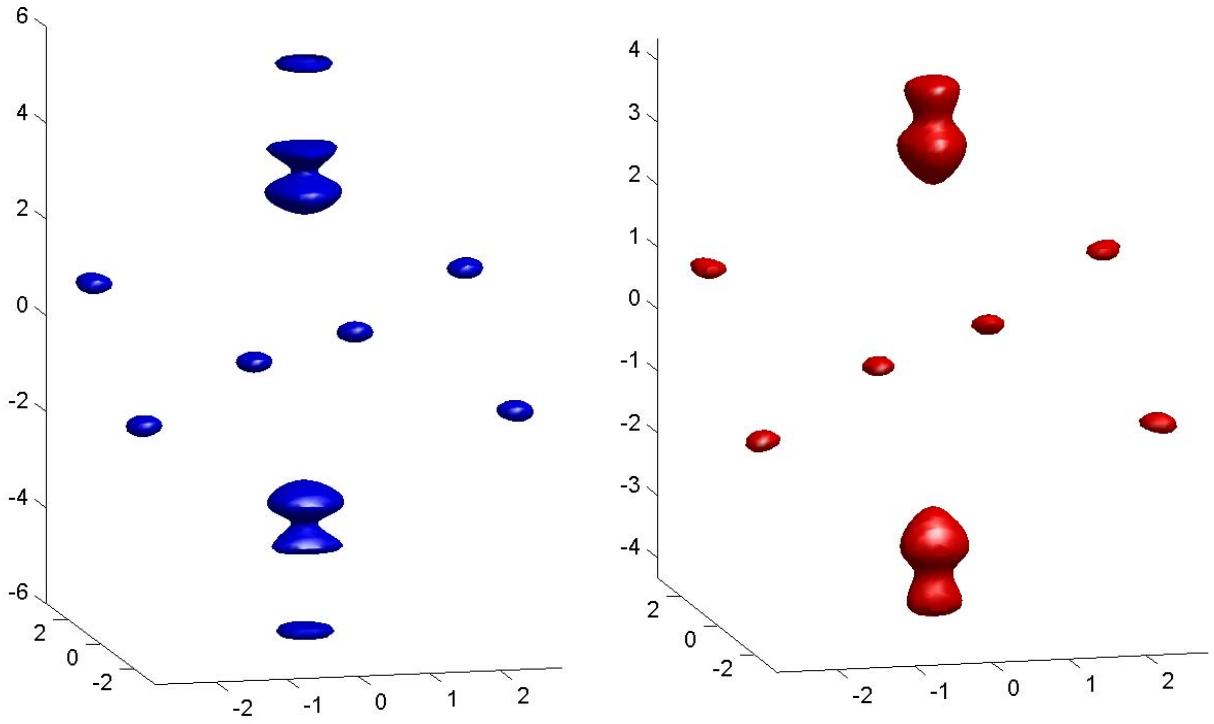

Fig.2. The reconstructed 3D image of the atoms (La and Sr) surounding the Mn center atom (Left panel room temperature, right panel 250 ^{o}C).