

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 via the User Portal:

<https://www.esrf.fr/misapps/SMISWebClient/protected/welcome.do>

Reports supporting requests for additional beam time

Reports can 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: Interplay of the electronic and lattice degrees of freedom in $A_{1-x}Fe_{2-y}Se_2$ superconductors under pressure

Experiment number:
HC 763

Beamline: ID24	Date of experiment: from: 24 Apr 2013 to: 29 Apr 2013	Date of report:
Shifts: 18	Local contact(s): C. Marini	<i>Received at ESRF:</i>

Names and affiliations of applicants (* indicates experimentalists):

M. Bendele*

B. Joseph*

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Report:

The local structure and electronic properties of $Rb_{1-x}Fe_{2-y}Se_2$ are investigated by means of site selective polarized x-ray absorption spectroscopy at the iron and selenium K-edges as a function of pressure. A combination of dispersive geometry and novel nanodiamond anvil pressure-cell has permitted to reveal a step-like decrease in the Fe-Se bond distance at $p = 11$ GPa and, at the same pressure, the local atomic structure of $Rb_{1-x}Fe_{2-y}Se_2$ becomes more ordered. Thus, at this pressure the phase separation might be suppressed which is having a large influence of the electronic structure, as evidenced by changes in the Fe K-edge pre-peak. The present results provide compelling evidence that the reemerging superconductivity in $A_{1-x}Fe_{2-y}Se_2$ is closely related to the transition to a locally more ordered state, having a different electronic structure.

Published in:

Interplay of the electronic and lattice degrees of freedom in $A_{1-x}Fe_{2-y}Se_2$ superconductors under pressure

M. Bendele, C. Marini, B. Joseph, G. M. Pierantozzi, A. S. Caporale, A. Bianconi, E. Pomjakushina, K. Conder, A. Krzton-Maziopa, T. Irifune, T. Shinmei, S. Pascarelli, P. Dore, N. L. Saini, and P. Postorino
Phys. Rev. B **88**, 180506(R) (2013).

