



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: Superionic water at high pressures and temperatures	Experiment number: HC3952
Beamline: ID27	Date of experiment: from: avril 2018 to: avril 2018	Date of report:
Shifts: 9	Local contact(s): Gaston Garbarino	<i>Received at ESRF:</i>
Names and affiliations of applicants (* indicates experimentalists): Jean-Antoine QUEYROUX – IMPMC – Paris Sandra NINET – IMPMC – Paris Frédéric DATCHI – IMPMC – Paris Gunnar WECK – CEA/DAM – Bruyères le Châtel		

Report:

The aim of this proposal was to explore the structural properties and P-T boundaries of the superionic phases of water, as a continuation of our previous run HC-2185. During this experiment, performed with a CO₂ laser heating, a major breakthrough was obtained with the detection of H₂O melting through the appearance of the fluid x-ray diffraction signal and evidence the existence of new superionic phases.

These data were published in the following articles:

- J.-A. Queyroux, J.-A. Hernandez, G. Weck, S. Ninet, T. Plisson, S. Klotz, G. Garbarino, N. Guignot, M. Mezouar, M. Hanfland, J.-P. Itié, and F. Datchi «Melting Curve and Isostructural Solid Transition in Superionic Ice », Phys. Rev. Lett. 125, 195501 (2020)

DOI: [10.1103/PhysRevLett.125.195501](https://doi.org/10.1103/PhysRevLett.125.195501)

- Gunnar Weck, Jean-Antoine Queyroux, Sandra Ninet, Frédéric Datchi, Mohamed Mezouar and Paul Loubeyre « Evidence and Stability Field of fcc Superionic Water Ice Using Static Compression » Phys. Rev. Lett. 128, 165701 (2022)

DOI: [10.1103/PhysRevLett.128.165701](https://doi.org/10.1103/PhysRevLett.128.165701)