



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>

Deadlines for submission of Experimental Reports

Experimental reports must be submitted within the period of 3 months after the end of the experiment.

Experiment Report supporting a new proposal (“relevant report”)

If you are submitting a proposal for a new project, or to continue a project for which you have previously been allocated beam time, you must submit a report on each of your previous measurement(s):

- even on those carried out close to the proposal submission deadline (it can be a “*preliminary report*”),
- even for experiments whose scientific area is different from the scientific area of the new proposal,
- carried out on CRG beamlines.

You must then register the report(s) as “relevant report(s)” in the new application form for beam time.

Deadlines for submitting a report supporting a new proposal

- 1st March Proposal Round - **5th March**
- 10th September Proposal Round - **13th September**

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.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report in English.
- include the experiment number 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.



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| | Experiment title: Pressure Tuning of Magnetism in Low-dimensional Quantum Magnet Fe ₃ GeTe ₂ : Nuclear Forward Scattering Study | Experiment number: HC-4298 |
| Beamline: ID18 | Date of experiment: from: 03/02/2021 to: 09/02/2021 | Date of report: 24/02/2021 |
| Shifts: 18 | Local contact(s): Dimitrios Bessas (email: bessas@esrf.fr) | <i>Received at ESRF:</i> |
| Names and affiliations of applicants (* indicates experimentalists): Sergey Kichanov, Olga Lis, Evgenii Lukin Frank Laboratory of Neutron Physics, Joint Institute for Nuclear Research, 141980 Dubna, Russian Federation | | |

Report:

The two-dimensional van der Waals (vdW) metallic ferromagnet Fe₃GeTe₂ is a perfect model material to experimentally access the fundamental physics of magnetism in reduced dimensions. Such materials, possessing magnetic ordering in a single atomic layer limit, are considered as magnetic analogues of graphene and very promising for development of advanced spintronics and nanoelectronics technologies. Due to weak inter-layer van der Waals forces, it is expected that magnetic, structural and other physical properties of these materials can be easily tuned by changes of thermodynamic parameters – pressure and temperature. In order to provide detailed insight into modification of microscopic magnetic and electronic properties of Fe₃GeTe₂ and, especially, search for spin crossover phenomena, one needs high pressure – low temperature techniques sensitive to local magnetic interactions in materials, such as synchrotron Mossbauer spectroscopy (SMS). For these purposes, we propose to perform experiments at ID18 by SMS in pressure range 0-30 GPa and temperature range 4-300 K.

Unfortunately, due to the restrictions corresponded with the epidemia of the COVID-18 virus in the France and around the world, we had to register a remote experiment and send a sample by post mail. As a result of unexpected influences, possibly during sample parcel delivery, the initial Fe₃GeTe₂ sample was chemically degraded and lost the original two-dimensional structure of the magnet. The rapid sending of another sample was not possible under the current epidemiological limitation. The previously planned experiments were not carried out.

In any case, we would like to note the well-coordinated work of the ID-18 beamline team. Everything possible was done on their part.

We plan to re-send proposal to another time and hope to solve this interesting problem in the nearest future.

