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 via the User Portal:

https://wwws.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.

ESRF	**Sliding Charge Density Waves in rare-earth tritellurides probed by coherent x-ray diffraction**	**Experiment number**: HC891
Beamline: Id01	**Date of experiment**: from: 25/09/2013 to: 01/10/2013	**Date of report**: 26/08/2014
Shifts: 18	**Local contact(s)**:T. Schulli	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

David le bolloc'h(1), V. Jacques(1), S. Sinchenko(2),P. Monceau(3),E. Lorenzo(3),L. Ortega(1).

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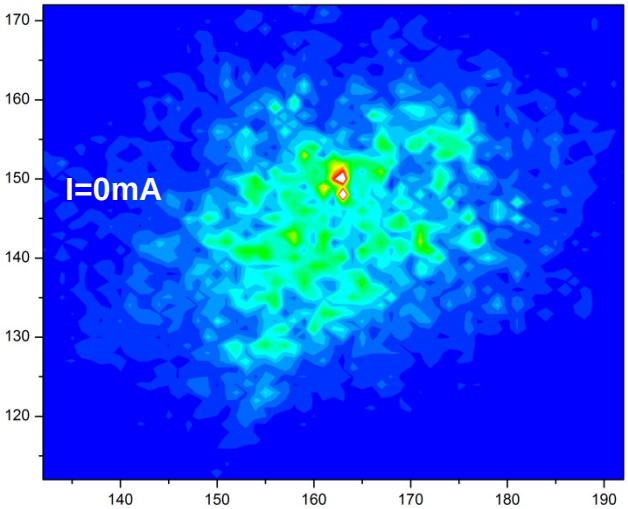
Report:

We have study the quasi-2D $TbTe_3$ system by coherent diffraction and *in situ* transport measurement at room temperature. The first results are very exiting: we clearly see that the periodic lattice distortion is directly related to the sliding state. When a strong decrease of the differential resistance is observed by transport measurements, a clear contraction of the CDW period is observed by coherent diffraction (see figure 1). Unfortunately, the crystal quality was not excellent and we lost some time to find the good CDW domain with the 0.5*0.5µm beam. As a consequence, by lack of time, we did not change the temperature or check the homogeneity of the sample.



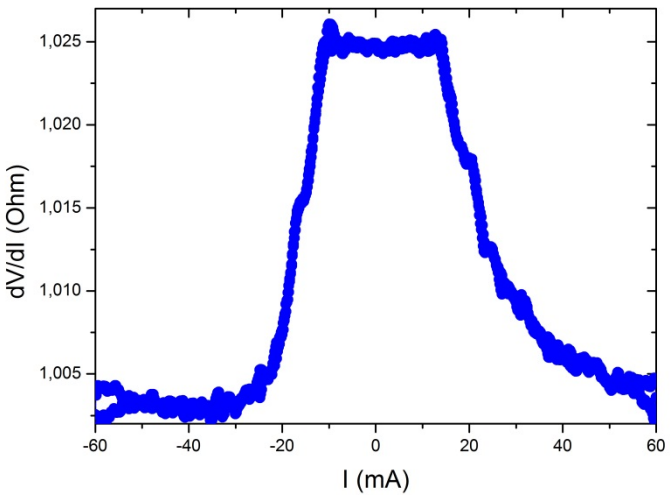


Figure1: speckle pattern of the (1 15 0.27) satellite reflection associated to the CDW in TbTe3 at T=300K, without external current and diferential resistance measured during the experiment at ID01 showing a drop of the differential resistivity at I=11mA.

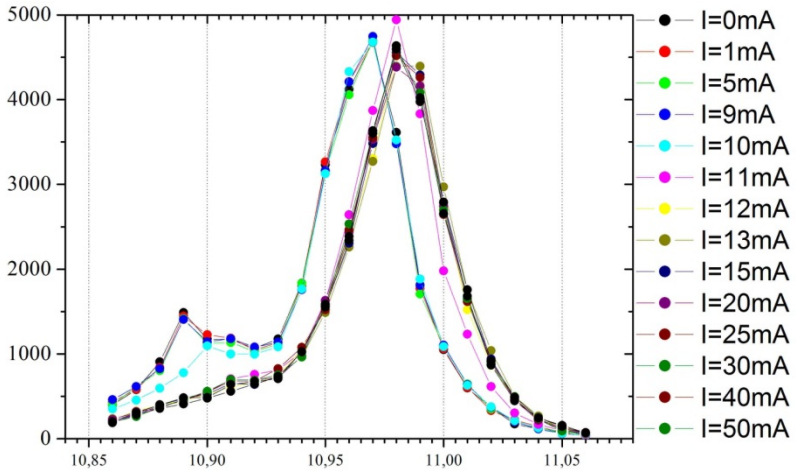


Figure 2: rocking curve of the satellite reflection versus the external current. A shift is obsreved at the threshold current I=11mA. This correspond to a contraction of the CDW period (not a heating effect).

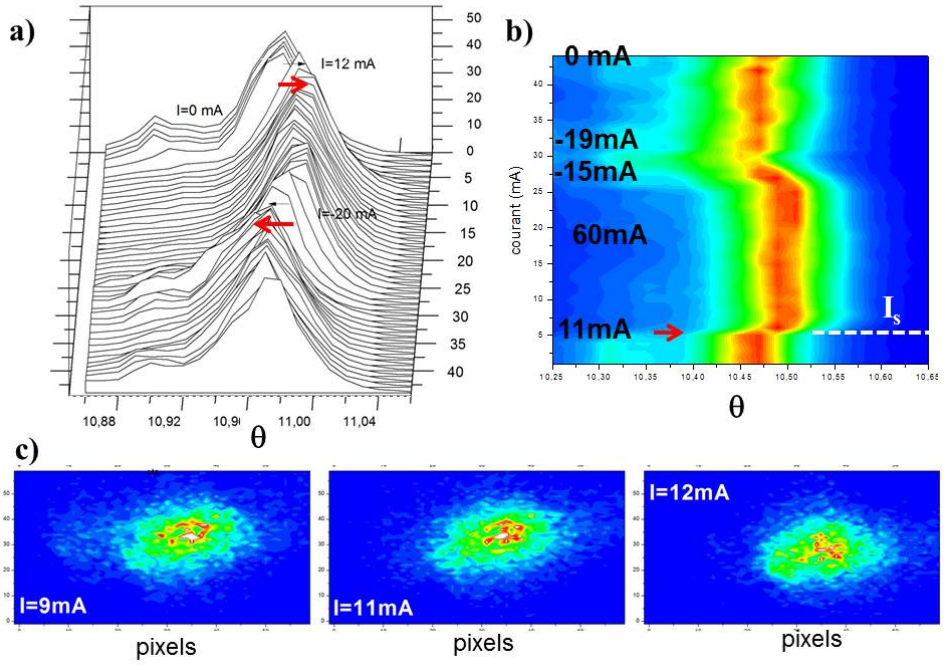


Figure 3: a) Rocking curve of the $2k_F$ satellite reflection (1 15 0.27) associated to the CDW in $TbTe_3$ versus the external current on both sides of the threshold currents (Is=11mA) at T= 300 K. A contraction of the CDW period is observed at the threshold current. b) Same data displayed as a 2D map. c) Speckle patterns below and above the threshold. A clear change of speckles is observed in the sliding state for I > 11mA [D. Le Bolloc'h, S. Sinchenko, V. Jacques, P. Monceau, submitted paper].