EUROPEAN SYNCHROTRON RADIATION FACILITY

INSTALLATION EUROPEENNE DE RAYONNEMENT SYNCHROTRON

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.

	Experiment title: Three dimensional crystals of the light-harvesting chlorophyll a/b protein complex from pea chloroplasts	**Experiment number**: LS-1764
Beamline:ID 14 1	**Date of experiment**: from:14-Feb-01 8:00 to:14-Feb-01 15:00	**Date of report**:
Shifts:	**Local contact(s)**: Dr. Sigrid Kozielski	*Received at ESRF:*

Names and affiliations of applicants (* indicates experimentalists):

Matteo Lamborghini, Jörg Standfuss and Werner Kühlbrandt

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Report:

Light-harvesting chlorophyll a/b protein complex (LHC-II) is the major collector of solar energy in all plants. It binds about half of the chlorophyll in green plants and it is probably the most abundant membrane protein on earth. LHC-II is a trimer in the photosynthetic membrane of nearly identical monomers, each consisting of 232 amino acids. Each monomer binds and orientates a minimum of 12 chlorophyll molecules and two carotenoids (lutein) for light harvesting and energy transfer. Although the structure of LHC-II has been determined at 3.4 resolution by electron microscopy of two-dimensional crystals, this is not sufficient to allow a complete understanding of the mechanism of energy transfer from LHC-II to the reaction centre, since the effective resolution in the *z* direction is 4.9 . In fact the chemical difference In addition the orientations of the chlorophyll tetrapyrroles have not been determined unambiguously. This is important for understanding the photochemical processes of energy trapping and transmission between Chl *a* and Chl *b* (a formyl group instead of the methyl group at the 7-position in the chlorin ring of the Chl *a*) is too small to be detected.. This project aims at solving the structure of LHC-II at high resolution so as to fully understand the mechanism of light-harvesting and energy transfer to the reaction centre in chloroplast membranes. LHC-II was purified from pea leaves by a standard procedure. Crystals grow by vapour diffusion in hanging drops. Hexagonal plates appear in a few days at 20 °C, measuring 0.2x0.2x0.01 mm.

Crystals were frozen in liquid nitrogen after harvesting with a loop from the drops. During the last experiment at ESRF of the eight hours allocated to our experiment only four could be used. In fact at the beginning of the shit a technical problem at the beam line occurred. As a consequence of this only few crystals could be tested and only an incomplete data set could be recorded.