s7.m0.p13 **Instrumentation for X-ray diffraction from crystals under electric fields.** P. Allé, R. Guillot, P. Fertey, N.K. Hansen, *Laboratoire de Cristallographie et Modélisation de Matériaux Minéraux et Biologiques, UPRESA-CNRS-7036, Université Henri Poincaré – Nancy I, B.P. 239, 54506 Vandoeuvre-lès-Nancy CEDEX, France*, and E. Elkaïm, *LURE, Bât.209D, Centre Universitaire Paris-Sud, B.P. 34 - 91898 Orsay CEDEX, France*. *e-mail: alle@lcm3b.u-nancy.fr*
Keywords: instrumentation, X-ray diffraction, electric field.

The aim of our work is to analyse by diffraction techniques the relevance of correlations between structural and physical properties in crystals to which an electric field is applied. We have developed a special equipment using a stroboscopic technique based on the ideas of previous work [1,2].

This instrumentation consists of:

1. a high voltage supply (V_{max}= 5 kV),
2. electronics for switching the electric field (+,0,-,0) at frequencies between 10^4 and 10^{-2} Hz,
3. four separate counting chains,
4. electronics for synchronising, with a tunable delay, the counting with the electric field switching,
5. control for step scanning of diffraction profiles.

The main control is done by a PC, which by help of complete software allows easy tuning of the experiment and data analysis. We have the total control of the counting time for each of the four field levels and this with a relative accuracy better than 10^{-4}.

The setup is transportable and is relatively easily connected to the motor controls of X-ray diffracto-meters. The equipment is designed for easy subsequent development of the experiment.

A first test of the instrument was carried out at LURE with the 4-circle diffractometer WDIF-4C, and shows good results: Bragg angles changes less than 0,0005° can be measured (details on the poster by R. Guillot *et al*.).

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s7.m0.p14 **Retinal polarization sensor.** A.M. Benoit[1], V. Louis[2], P. Alle[1]. *[1] Laboratoire de Cristallographie et Modélisation des Matériaux Minéraux et Biologiques - UMR CNRS – 7036 - Faculté des Sciences BP 239-54506 Vandoeuvre-lès-Nancy - FRANCE. [2] Centre de Recherche en Automatique de Nancy - CRAN UPRES-A CNRS7039 2, Avenue de la Forêt de Haye - 54516 Vandoeuvre-lès-Nancy - FRANCE. Email : benoita@lcm3b.u-nancy.fr*
Keywords: instrumentation, linear dichroism, retinal nerve fiber.

At the present time, there is not enough reliable means to an early diagnostic of glaucoma. The measuring methods of the thickness of the retinal nerve fiber layer are rather limited[1], and the diagnostic by the visual field examination or by the optic nerve head photographs permits a too belated detection.

It appears that the very asymmetric structure[2] of the retinal nerve fiber layer produces a partial polarization in the light scattered back from the retina. This polarization is function of the number of available nerve fibers on the retina. The glaucoma can cover all or a part of these fibers and then modifies the degree of beam polarization.

Our instrument uses the light beam of an ophthalmoscope to detect any variation of the polarization. The unpolarized laser beam is focused on a retina point. The light scattered back from the retina is polarized by the nerve fiber layer, analysed by a Nicol prism in rotation and collected by an optical detector. The sensor is connected to an automatically controlled testing bench including a signal-processing card, an engine driving the "polarimeter" and an acquisition chain on a computer. The degree of polarization is measured on five specific points of the retina.

In conclusion, the spectral analysis confirms the hypothesis of properties of polarization for the layer of nerve fiber of the retina. The first clinic results show a different linear dichroism for normal and glaucoma patients.

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