



**Experiment title:**

**High resolution wide angle diffraction data on native cellulose polymorphs**

**Experiment number:**

SC-619

**Beamline:**

ID-2

**Date of experiment:**

from:29 September 99 to:1 October 99

**Date of report:**

10 October 99

**Shifts: 6**

**Local contact: Bjarne Rasmussen**

*Received at ESRF:*

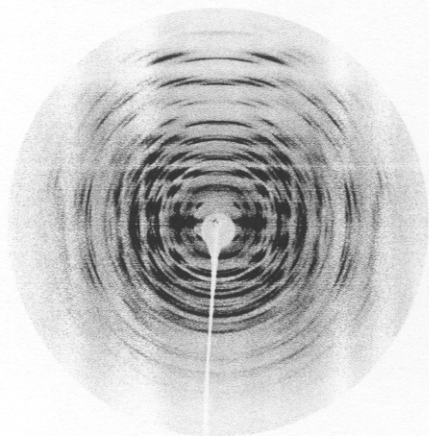
**Names and affiliations of applicants (\* indicates experimentalists):**

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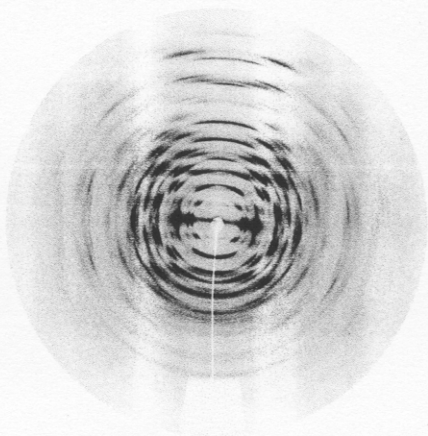
\* Katrin Gessler, Cermav-CNRS

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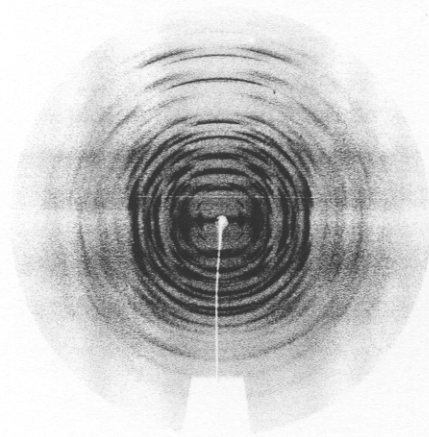
**Report:** The experiments involved the collection of a series of X-ray diffraction diagrams on several cellulose fiber samples, namely (i) a sample of cellulose  $I_{\beta}$  from *Halocynthia*, (ii) a sample of cellulose  $I_{\alpha}$  from *Glaucocystis*, (iii) a sample of cellulose III1 obtained by treating a sample of *Cladophora* with ammonia under high pressure and temperature, (iv) a sample of highly stretched cellulose II obtained by mercerization of flax. All samples were mounted with their fiber axis along the  $\phi$  axis of the goniometer and various tilting angles were applied by varying the angles  $\psi$ ,  $\omega$  as well as the total cradle that was rotated up to  $25^{\circ}$ . The diagrams were recorded at a wavelength of  $0.7208 \text{ \AA}$ , setting the MAR detector at 175 mm. Under these conditions, diagrams having a resolution of better than  $1 \text{ \AA}$  were obtained. By rotating the cradle, some patterns with a resolution of  $0.7 \text{ \AA}$  along the fiber axis could be obtained. Some of the patterns are reproduced in this report. This data collection will be coupled with similar patterns obtained at ILL, D19 on hydrogenated and deuterated celluloses.



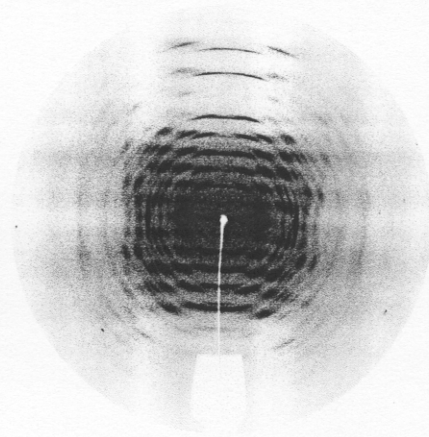
cellulose I $\beta$  (Halocynthia)



cellulose I $\alpha$  (Glaucocystis)



cellulose III<sub>1</sub>



cellulose II, tilted 10 degrees  
around the equator