

PRECISE MEASUREMENTS OF DIELECTRIC ANISOTROPY IN  
ICE Ih AT 35 GHz USING AN OPEN MICROWAVE RESONATOR  
(ABSTRACT)

Shigenori MORISHIMA, Shuji FUJITA, Takeshi MATSUOKA and Shinji MAE

*Department of Applied Physics, Faculty of Engineering, Hokkaido University,  
Kita-13, Nishi-8, Kita-ku, Sapporo 060*

Precise measurement of the dielectric anisotropy in ice Ih at 35 GHz was carried out using an open microwave resonator (Fabry-Perot resonator).

The purpose of the measurement was to obtain physical parameters necessary for analysis of the polarization state of the electromagnetic waves that propagate through ice masses. The open resonator method was used, because it is suitable for detecting the precise value of dielectric anisotropy, since we can detect both components, permittivity parallel to the  $c$ -axis ( $\epsilon'_{//c}$ ) and permittivity perpendicular to the  $c$ -axis ( $\epsilon'_{\perp c}$ ), at once from a single ice crystal without moving.

The result of the measurement at  $-20^{\circ}\text{C}$  was as follows:  $\epsilon'_{//c}$  is  $3.2016 \pm 0.0003$  and  $\epsilon'_{\perp c}$  is  $3.1681 \pm 0.0003$ . Thus the dielectric anisotropy ( $\Delta\epsilon' = \epsilon'_{//c} - \epsilon'_{\perp c}$ ) becomes  $0.0335 \pm 0.0004$ .

*(Received December 14, 1993)*