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Measurement of RF electric field in high-β plasma using a Pockels detector in magnetosphere plasma confinement device RT-1[1] TOSHIKI MUSHIAKE, M. NISHIURA, Z. YOSHIDA, Y. YANO, Y. KAWAZURA, H. SAITOH, M. YAMASAKI, A. KASHYAP, N. TAKAHASHI, M. NAKATSUKA, Graduate School of Frontier Sciences, The University of Tokyo, ATSUSHI FUKUYAMA, Department of Nuclear Engineering, Kyoto University — The magnetosphere plasma confinement device RT-1 generates a dipole magnetic field that can confine high-β plasma by using a levitated superconducting coil. So far it is reported that high temperature electrons (up to 50keV) exist and that the local electron β_e value exceeds more than 100%. However, the ion β value β_i remains low in the present high-β state. To realize a high-β_i state, we have started Ion Cyclotron Heating (ICH) experiments. For efficient ICH in a dipole topology, it is important to measure RF electric fields and characterize the propagation of RF waves in plasmas. On this viewpoint, we started direct measurement of local RF electric fields in RT-1 with a Pockels sensor system. A non-linear optical crystal in the Pockels sensor produces birefringence in an ambient electric field. The refractive index change of the birefringence is proportional to the applied electric field strength, which can be used to measure local electric fields. RF electric field distribution radiated from an ICH antenna was measured inside RT-1 in air, and was compared with numerical results calculated by TASK code. Results on the measurement of electric field distribution in high-β plasma and evaluation of the absorbed RF power into ions will be reported.

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