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Curling probe measurement of large-volume pulsed plasma confined by surface magnetic field ANIL PANDEY, Chubu University, WATARU SAKAKIBARA, HIROYUKI MATSUOKA, DOWA Thermotech, KEIJI NAKAMURA, HIDEO SUGAI, Chubu University, CHUBU UNIVERSITY TEAM, DOWA THERMOTECH COLLABORATION — *Curling probe* (CP) has recently been developed which enables the local electron density measurement even in plasma for non-conducting film CVD. The electron density is obtained from a shift of resonance frequency of spiral antenna in discharge ON and OFF monitored by a network analyzer (NWA). In case of a pulsed glow discharge, synchronization of discharge pulse with frequency sweep of NWA must be established. In this paper, we report time and space-resolved CP measurement of electron density in a large volume plasma (80 cm diameter, 110 cm length) confined by surface magnetic field (multipole cusp field ~ 0.03 T). For plasma-aided modification of metal surface, the plasma is produced by 1 kV glow discharge at pulse frequency of 0.3 – 25 kHz with various duty ratio in gas (Ar, N₂, C₂H₂) at pressure ~ 1 Pa. A radially movable CP revealed a remarkable effect of surface magnetic confinement: detach of plasma from the vessel wall and a fairly uniform plasma in the central region. In afterglow phase, the electron density was observed to decrease much faster in C₂H₂ discharge than in Ar discharge.

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