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Particle transport characteristics of the RT-1 magnetospheric plasma using gas-puffing modulation technique NAOKI KENMOCHI, MASAKI NISHIURA, ZENSHO YOSHIDA, TETSUYA SUGATA, KAORI NAKAMURA, SHOTARO KATSURA, Graduate School of Frontier Sciences, The University of Tokyo — The Ring Trap 1 (RT-1) device creates a laboratory magnetosphere that is realized by a levitated superconducting ring magnet in vacuum. The RT-1 experiment has demonstrated the self-organization of a plasma clump with a steep density gradient; a peaked density distribution is spontaneously created through inward diffusion. In order to evaluate particle transport characteristics in the RT-1 magnetospheric plasmas which cause these inward diffusion, density modulation experiments were performed in the RT-1. Density modulation is a powerful method for estimating a diffusion coefficient D and a convection velocity V by puffing a periodic neutral gas. The gas puff modulation causes the change in the electron density measured by two chords of microwave interferometer (the radial positions r = 60 and 70 cm, vertical chord). In the case of 2 Hz gas puff modulation, the phase delay and the modulation-amplitude decay at the chord r = 60 cm are obtained with 15 degree and 0.8, respectively, with respect to the phase and the amplitude at r = 70 cm. The particle balance equations are solved on the assumption of profile shapes for D to evaluate D, V and particle source rate. The result suggests the inward convection in high beta magnetospheric plasmas.

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