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Initial results on positron confinement in a magnetospheric configuration[1] HARUHIKO SAITOH, ZENSHO YOSHIDA, YOSHIHISA YANO, JUNJI MORIKAWA, University of Tokyo — Creation of positron-electron plasma in a laboratory is an interesting and challenging subject, which may open many scientific applications. Although single-component plasma is stably confined in linear traps, for example Penning-Malmberg trap, it is not straightforward to simultaneously confine electrons and positrons as plasma. Toroidal geometries have advantages for solving this problem. For this purpose, studies on toroidal non-neutral plasma have been conducted in the levitated magnetospheric configuration, RT-1. Stable confinement and self-organization of toroidal non-neutral plasma was realized in RT-1; rigid-rotating pure electron plasma is confined for more than 300s [Z. Yoshida et al., PRL 104, 235004 (2010)]. As the initial step toward the formation of magnetospheric antimatter plasmas, we installed a 1MBq Na-22 radiation source in RT-1. Annihilation gamma-rays were observed by a NaI(TI) scintillator detector, for the estimation of basic injection and confinement properties of positrons in the magnetospheric configuration. Numerical analysis of positron orbits in RT-1 and the initial experimental results will be presented.

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