# Characteristic of a repetitively injected spheromak in a vertical guide-field

H.Itagaki, H.Numasawa, K.Kishi, Y.Terashima, Y.Fujita, T.Awane, T.Asai, T.Takahashi, Y.Hirano

*Nihon University, Chiyoda-ku, Tokyo 101-8308, Japan*

itagaki@pyxis.phys.cst.nihon-u.ac.jp

A spheromak generated by magnetic coaxial plasma gun (MCPG) is expected as a fuel and magnetic helicity injector for fusion reactor core because a gun-spheromak is easily accelerated due to self Lorentz force and has a significant amount of magetic helicity. Usually, the ejected spheromak is injected to the target torus through a metallic drift tube. Then the induced eddy current gives a radial pressure balance on to the plasmoid. However, electrical insulation between a MCPG and target chamber has advantage for advanced application of MCPG for the current drive, control of dynamo activity and so on. Then we have studied a behavior of spheromaks in a drift chamber made of insulating material with vertical (parallel to the drift tube axis) guide magnetic field which forms radial pressure balance on the spheromak. Figure 1 shows a typical schematic diagram of experimental setup. In the present study, a Pyrex glass tube is employed as drift tube and mirror confinement field is applied as shown Fig.1. Multi-channel optical diagnostics for the spatial profile of line emission and internal magnetic probe are arranged on the drift chamber as shown.

In the previous experiments, higher efficiency of magnetic flux generation has been observed in the case with repetitive ejection of spheromak. Then in this work, the efficiency of magnetic helicity generation have been studied with the mirror confinement field. Repetitive injection also have a potential to reduce the disturbance on a target plasma. Therefore magnetic fluctuation in the mirror-confined spheromak plasma has also been measured.

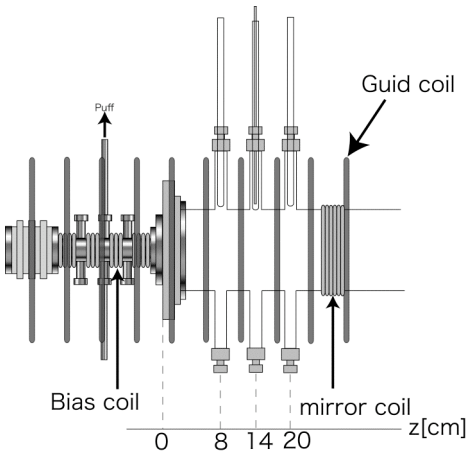


Fig.1 Schematic view of the experimental setup.