

Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Development of rotating magnetic field coil system in the HIST spherical torus device T. YOSHIKAWA, Y. KIKUCHI, S. YAMADA, S. HASHIMOTO, T. NISHIOKA, N. FUKUMOTO, M. NAGATA, Univ. of Hyogo — Coaxial Helicity Injection (CHI) is one of most attractive methods to achieve non-inductive current drive in spherical torus devices. The current drive mechanism of CHI relies on MHD relaxation process of rotating kink behavior [1], so that there is a possibility to control the CHI by using an externally applied rotating magnetic field (RMF). We have recently started to develop a RMF coil system in the HIST spherical torus device. Eight coils are located above and below the midplane at four toroidal locations so that the RMF is resonant with $n = 1$ rotating kink mode driven by the CHI. In addition, the RMF coil set is installed inside a flux conserver of 5 mm thickness (cut-off frequency ~ 170 Hz) so that the RMF penetrates into the plasma. The coil winding is made of 20 turns of enameled copper circular wires (1.5 mm^2 conductor cross section), covered with a thin stainless steel case of 0.5 mm thickness (cut-off frequency ~ 710 kHz). The RMF system is driven by an IGBT inverter power supply (nominal current: 1 kA, nominal voltage: 1 kV) with an operating frequency band from 10 kHz to 30 kHz. The estimated amplitude of RMF neglecting effects of image current at the flux conserver is a few tens Gauss at around the magnetic axis. A preliminary experimental result will be shown in the conference. [1] M. Nagata, et al., *Physics of Plasmas* **10**, 2932 (2003).

Yusuke Kikuchi
University of Hyogo

Date submitted: 20 Jul 2007

Electronic form version 1.4