

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Measurements of dynamo effect on double-CHI pulse ST plasmas on HIST** K. ITO, T. HANAO, M. ISHIHARA, K. MATSUMOTO, T. HIGASHI, Y. KIKUCHI, N. FUKUMOTO, M. NAGATA, University of Hyogo — Coaxial Helicity injection (CHI) is an efficient current-drive method used in spheromak and spherical torus (ST) experiments. An anticipated issue for CHI is achieving good energy confinement, since it relies on the magnetic relaxation and dynamo. This is essentially because CHI cannot drive a dynamo directly inside a closed magnetic flux surface. Thus, it is an important issue to investigate dynamo effect to explore CHI current drive mechanisms in a new approach such as Multi-pulsing CHI method. To study the dynamo model with two-fluid Hall effects, we have started from the generalized Ohm law. We have measured each MHD dynamo term and Hall dynamo term separately by using Mach probe and Hall probe involving 3-axis magnetic pick-up coils. The result shows that the induced electric field due to MHD dynamo is large enough to sustain the mean toroidal current against resistive decay in the core region. In the other hand, the anti-dynamo effect in the MHD dynamo term is observed in the central open flux column (OFC) region. From the viewpoint of two-fluid theory, ion diamagnetic drift is opposite to the electron diamagnetic drift, maybe resulting in the anti-dynamo effect. Hall dynamo may arise from the fluctuating electron diamagnetic current due to high electron density gradient which is large in the OFC region.

Yusuke Kikuchi  
University of Hyogo

Date submitted: 21 Jul 2011

Electronic form version 1.4