Abstract Submitted
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Measurements of dynamo electric field and momentum transport induced by fluctuations on HIST H. HIRONO, T. HANAO, T. HYOBU, K. ITO, K. MATSUMOTO, T. NAKAYAMA, 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. It is an important issue to investigate dynamo effect to explore CHI current drive mechanisms. To establish the dynamo model with two-fluid Hall effects, we verify the parallel mean-field Ohm's law balance. The spatial profiles of the MHD/Hall dynamo electric fields are measured by using Mach probe and Hall probe involving 3-axis magnetic pick-up coils. The MHD/Hall fluctuation-induced electromotive forces are large enough to sustain the mean toroidal current against the resistive decay. We have measured the electron temperature and the density with great accuracy by using a new electrostatic probe with voltage sweeping. The result shows that the electron temperature is high in the core region and low in the central open flux column (OFC), and the electron density is highest in the OFC region. The Hall dynamo becomes more dominant in a lower density region compared to the MHD dynamo. In addition, the fluctuation-induced Maxwell and Reynolds stresses are calculated to examine the fast radial transport of momentum from the OFC to the core region during the dynamo drive.

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