

Abstract Submitted
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Two-fluid dynamo relaxation and momentum transport induced by CHI on HIST MASAYOSHI NAGATA, HIDETOSHI HIRONO, TAKAFUMI HANAO, TAKAHIRO HYOBU, KENGO ITO, KEISUKE MATSUMOTO, TAKASHI NAKAYAMA, NOBUHARU OKI, YUSUKE KIKUCHI, NAOYUKI FUKUMOTO, University of Hyogo — Non-inductive current drive by using Multi-pulsing coaxial helicity injection was studied on HIST. In the double-pulsing CHI experiment, we have examined two-fluid effects by reversing polarity of the bias poloidal coil current. In the ST magnetic configurations with the right-handed magnetic field (positive CHI), there are a diamagnetic structure in the open flux column region and a paramagnetic structure in the closed flux region. It is naturally understood that the direction of the poloidal magnetic field (toroidal current) is reversed in reversing the polarity of the bias flux from positive to negative. However, the poloidal current is surprisingly reversed in reversing the magnetic helicity polarity. The direction of the poloidal current is opposite in the each region. The toroidal flow is reversed, but a shear profile of the poloidal flow is not changed significantly. In this configuration, the diamagnetic structure appears in the closed flux region. Thus, not only $J_{tx}B_p$ but also $J_{px}B_t$ force contributes on pressure balance leading to a higher beta. We are studying a more general helicity conservation that constrains the interaction between flows and magnetic fields and momentum transport in the two-fluid framework.

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