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Development of a new experimental device for long-duration magnetic reconnection in weakly ionized plasma RYOMA YANAI, YASUHIRO KAMINOU, Univ of Tokyo-Kashiwanoha, KENTO NISHIDA, Univ of Tokyo, MICHIAKI INOMOTO, Univ of Tokyo-Kashiwanoha — Magnetic reconnection is a universal phenomenon which determines global structure and energy conversion in magnetized plasmas. Many experimental studies have been carried out to explore the physics of magnetic reconnection in fully ionized condition. However, it is predicted that the behavior of magnetic reconnection in weakly ionized plasmas such as solar chromosphere plasma will show different behavior such as ambipolar diffusion caused by interaction with neutral particles. In this research, we are developing a new experimental device to uncover the importance of ambipolar diffusion during magnetic reconnection in weakly ionized plasmas. We employ an inverter-driven rotating magnetic fields technique, which is used for generating steady azimuthal plasma current, to establish long-duration (~1 ms) anti-parallel reconnection with magnetic field of ~5 mT in weakly ionized plasma. We will present development status and initial results from the new experimental setup. This work was supported by JSPS A3 Foresight Program Innovative Tokamak Plasma Startup and Current Drive in Spherical Torus, Giant-in Aid for Scientific Research (KAKENHI) 15H05750, 15K14279, 26287143 and the NIFS Collaboration Research program (NIFS14KNWP004).

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