

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Performance improvement of magnetized coaxial plasma gun by magnetic circuit on a bias coil TAKAHIRO EDO, TADAFUMI MATSUMOTO, TOMOHIKO ASAI, College of Science and Technology, Nihon University, YASUHIRO KAMINO, MICHIAKI INOMOTO, Graduate school Frontier Sciences, the University of Tokyo, HIROSHI GOTA, Tri Alpha Energy, Inc. — A magnetized coaxial plasmoid accelerator has been utilized for compact torus (CT) injection to refuel into fusion reactor core plasma. Recently, CT injection experiments have been conducted on the C-2/C-2U facility at Tri Alpha Energy [1,2]. In the series of experiments successful refueling, i.e. increased particle inventory of field-reversed configuration (FRC) plasma, has been observed. In order to improve the performance of CT injector and to refuel in the upgraded FRC device, called C-2W, with higher confinement magnetic field, magnetic circuit consisting of magnetic material onto a bias magnetic coil is currently being tested at Nihon University. Numerical work suggests that the optimized bias magnetic field distribution realizes the increased injection velocity because of higher conversion efficiency of Lorenz self force to kinetic energy. Details of the magnetic circuit design as well as results of the test experiment and field calculations will be presented and discussed. [1] T. Matsumoto *et al.*, Rev. Sci. Instrum. **87**, 053512 (2016). [2] T. Roche *et al.*, Bull. Am. Phys. Soc. **60**, BP12.00023 (2015).

Takahiro Edo
College of Science and Technology, Nihon University

Date submitted: 14 Jul 2016

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