

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Studies on Plasmoid Merging using Compact Toroid Injectors IAN ALLFREY, TADAFUMI MATSUMOTO, THOMAS ROCHE, HIROSHI GOTA, Tri Alpha Energy, Inc., TAKAHIRO EDO, TOMOHIKO ASAI, Nihon University, DANIEL SHEFTMAN, DIMA OSIN, Tri Alpha Energy, Inc., NIHON UNIVERSITY TEAM, TAE TEAM, TRI ALPHA ENERGY, INC. TEAM — C-2 and C-2U experiments [1] have used magnetized coaxial plasma guns (MCPG) to inject compact toroids (CTs) for refueling the long-lived advanced beam-driven field-reversed configuration (FRC) plasma [2]. This refueling method will also be used for the C-2W experiment. To minimize momentum transfer from the CT to the FRC two CTs are injected radially, diametrically opposed and coincident in time. To improve understanding of the CT characteristics TAE has a dedicated test bed for the development of CT injectors (CTI), where plasmoid merging experiments are performed. The test bed has two CTIs on axis with both axial and transverse magnetic fields. The ~ 1 kG magnetic fields, intended to approximate the magnetic field strength and injection angle on C-2W, allow studies of cross-field transport and merging. Both CTIs are capable of injecting multiple CTs at up to 1 kHz. The resulting merged CT lives $>100 \mu\text{s}$ with a radius of ~ 25 cm. More detailed results of CT parameters will be presented. [1] M. Binderbauer et al., *Physics of Plasmas*, 22, 056110 (2015). [2] T. Matsumoto et al., *Rev. Sci. Instrum.* 87, 053512 (2016).

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Date submitted: 24 Aug 2017

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