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6.48 Internal Magnetic Field Measurements of Translated and Merged Field-Reversed Configuration Plasmas in the FAT-CM Device

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Field-reversed configuration (FRC) Amplification via Translation – Collisional Merging (FAT-CM) experiments have recently commenced to study physics phenomena of collisions and merged FRC plasma states [1]. Two independently formed FRCs are translated into the confinement region of the FAT-CM device, collided near the midplane of the device with a relative speed of up to ˜400 km/s, and a final merged FRC plasma state is achieved; this FRC collisional merging technique is essentially the same as in the C-2/C-2U experiments [2,3]. To measure magnetic field profiles of the translated and merged FRC plasmas, an internal magnetic probe array, developed/provided by TAE Technologies [3], has been installed in the midplane of the FAT-CM device. Initial magnetic field measurements indicate that both the translated and the merged FRC plasma states exhibit a clear field-reversal structure, which is qualitatively in good agreement with 2-D MHD simulations.

[1] F. Tanaka et al., in 26th Int'l Toki Conf., P2-17 (2017).
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[3] H. Gota et al., Rev. Sci. Instrum. 83, 10D706 (2012).

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