Initial results of collisional merging experiments in FAT-CM device

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A field-reversed configuration (FRC) is a compact toroid with primarily a poloidal magnetic field [1]. Because of its simply-connected configuration, an FRC can be translated axially, and trapped in a confinement chamber along an interconnecting guide magnetic field. Field-reversed theta-pinch (FRTP) method is a promising technique to form an FRC since FRTP-FRCs are typically high-temperature (~1keV) and highly-dense (~$10^{21}m^{-3}$). To reach a burning state as FRC based reactor, however additional heating and current-drive methods are necessary and underdeveloped. A field-reversed configuration (FRC) device FAT-CM has been newly launched to validate additional heating and current-drive methods. The FAT-CM device is consisted of two field-reversed theta-pinch plasma sources with total stored energy of approximately 100 kJ and a metallic confinement chamber with the inner diameter of φ0.775 m and the length of 2 m in the straight section. To evaluate the effect of additional heating and current-drive, an FRC with long life-time compared with transient response time such as particle collisional time scale is required. Therefore, collisional merging formation technique [2] is employed for the FAT-CM. The initial results of collisional merging experiments in FAT-CM device are presented.

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