

Abstract Submitted
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Formation of Electric Potential in Counter-helicity Spheromak

Merging YASUHIRO KAMINO, Graduate School of Frontier Sciences, University of Tokyo, SHIZUO INOUE, TORU II, Graduate School of Engineering, University of Tokyo, MICHIAKI INOMOTO, YASUSHI ONO, Graduate School of Frontier Sciences, University of Tokyo — We studied merging formation process of Field-Reversed Configuration (FRC). In this method, an FRC is formed by merging of two spheromaks with opposing toroidal magnetic fields through magnetic reconnection, named “counter-helicity spheromak merging.” During this merging, the reconnection electric field has not only the toroidal component but also the radial component which accelerate/ decelerate unmagnetized ions in inboard or outboard direction depending on opposing toroidal magnetic field polarities of initial spheromaks, called case-O and case-I mergings. Based on electrostatic potential and ion velocity measurements, the generated radial electric field significantly affects ion outflow profiles, causing significant unbalance between inboard and outboard outflows from the X-point. In case-O, direction of radial electric field is inward, and in case-I, that is outward. The difference in electric field direction and that in Hall effect probably cause asymmetry between case-O and case-I mergings. The asymmetry is maintained after the merging completion, causing difference between magnetic fluxes of case-O and case-I FRCs.

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