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Experiment on two RMF-driven FRCs' magnetic reconnection

TIAN-SEN HUANG, YURI PETROV, XIAOKANG YANG, Prairie View A&M University — Magnetic reconnection experiments in RMF-driven FRC plasma are performed in an 80cm/40cm diameter cylindrical chamber with an additional magnetic coil mounted at the mid-plane. In the experiments, RMF produced by two 500 kHz rf generators drives a plasma current about 2 - 3 kA in the presence of a vertical magnetic field 40 – 60 G. During a 40 ms, 200 kW power discharge, a 10 ms pulse-current above the threshold value 1500 A is applied to the mid-plane coil to sever the plasma current into two rings and form two FRCs. When the current in the mid-plane coil drops to zero, the two FRCs merge into one FRC again. In the experiments, variations in plasma current, magnetic field profile and H-alpha signal were measured. Both the magnetic field evolution and the change of H-alpha signal show the magnetic reconnection process.

Tian-Sen Huang
Prairie View A&M University

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