

Abstract Submitted  
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**Interaction of Fast Ions with Global Plasma Modes in the C-2 Field Reversed Configuration Experiment** ARTEM SMIRNOV, SEAN DETTRICK, RYAN CLARY, SERGEY KOREPANOV, MATTHEW THOMPSON, ERIK TRASK, MICHEL TUSZEWSKI, Tri Alpha Energy, Inc. — A high-confinement operating regime [1] with plasma lifetimes significantly exceeding past empirical scaling laws was recently obtained by combining plasma gun edge biasing and tangential Neutral Beam Injection (NBI) in the C-2 field-reversed configuration (FRC) experiment [2, 3]. We present experimental and computational results on the interaction of fast ions with the  $n=2$  rotational and  $n=1$  wobble modes in the C-2 FRC. It is found that the  $n=2$  mode is similar to quadrupole magnetic fields in its detrimental effect on the fast ion transport due to symmetry breaking. The plasma gun generates an inward radial electric field, thus stabilizing the  $n=2$  rotational instability without applying the quadrupole magnetic fields. The resultant FRCs are nearly axisymmetric, which enables fast ion confinement. The NBI further suppresses the  $n=2$  mode, improves the plasma confinement characteristics, and increases the plasma configuration lifetime [4]. The  $n=1$  wobble mode has relatively little effect on the fast ion transport, likely due to the approximate axisymmetry about the displaced plasma column.

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