Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

Increased FRC lifetimes using a longer trap[1] G.A. WURDEN, Los Alamos National Laboratory, T.C. GRABOWSKI, J.H. DEGNAN, M.T. DOMONKOS, E.L. RUDEN, Air Force Research Laboratory, M.H. FRESE, S.D. FRESE, F.J. CAMACHO, S.K. COFFEY, NumerEx LLC, G.F. KIUTTU, Varitech Services, A.G. LYNN, University of New Mexico, K. YATES, B.S. BAUER, S.R. FUELLING, University of Nevada, Reno — Increasing the lifetime of the field reversed plasma in the FRCHX experiment for magnetized target fusion, has been our primary concern for the last two years. We report that the most significant increase in lifetime has resulted from lengthening the magnetic well in the liner trapping region. We have suspected for some time based on modeling and FRC lore, that a longer trapping region would be beneficial, but were constrained by the 10-cm diameter, 30-cm long metal liner. Rather than redesigning implosion hardware, we simply moved the entrance mirror downward 5 cm, and the end mirror upwards 5 cm. Now the distance between the dynamic mirror points is $\sim$ 30 cm. Trapped flux lifetimes of FRCHX FRCs, as measured from the half maximum of the increasing exclusion radius in the formation region to the half maximum of the decreasing exclusion radius in trapped region now range from $\sim$ 19 μs to $\sim$ 21 μs. The analogous measure of lifetime just in the trapping region is 14 $\sim$ 16 μs, whereas it used to be only 8-11 μs. Combined with a delay in the start of the FRC formation relative to the liner implosion time, we are well-positioned to conduct another dynamic HEDLP MTF implosion test.

[1]Supported by the Fusion Energy Sciences office in DOE, LANS DE-AC52-06NA25396, & AFRL IA DE-AI02-04ER54764.

Glen Wurden
Los Alamos National Laboratory

Date submitted: 09 Jul 2013 Electronic form version 1.4