Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Design Point for a Spheromak Compression Experiment[1] SIMON WOODRUFF, Woodruff Scientific, CARLOS A. ROMERO-TALAMAS, JOHN O'BRYAN, University of Maryland Baltimore County, JAMES STUBER, Woodruff Scientific, DARPA SPHEROMAK TEAM — Two principal issues for the spheromak concept remain to be addressed experimentally: formation efficiency and confinement scaling [1]. We are therefore developing a design point for a spheromak experiment that will be heated by adiabatic compression, utilizing the CORSICA and NIMROD codes as well as analytic modeling with target parameters R_initial=0.3m, R_final=0.1m, T_initial=0.2keV, T_final=1.8keV, n_initial=1019m-3 and n_final= 1021m-3, with radial convergence of C=3. This low convergence differentiates the concept from MTF with C=10 or more, since the plasma will be held in equilibrium throughout compression. We present results from CORSICA showing the placement of coils and passive structure to ensure stability during compression, and design of the capacitor bank needed to both form the target plasma and compress it. We specify target parameters for the compression in terms of plasma beta, formation efficiency and energy confinement.

[1] Woodruff, Miller Cost sensitivity analysis for a 100 MWe modular power plant and fusion neutron source J. Fus. Eng. Design (2014)

[1]Work performed under DARPA grant N66001-14-1-4044.

Simon Woodruff
Woodruff Scientific

Date submitted: 24 Jul 2015 Electronic form version 1.4