Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

SSPX Achievements and Future Directions for Spheromak Research H.S. MCLEAN, R.D. WOOD, D.N. HILL, E.B. HOOPER, B. HUDSON, R.J. JAYAKUMAR, L.L. LODESTRO, J.M. MOLLER, C.A. ROMERO-TALAMAS, T.A. CASPER, B.I. COHEN, T.K. FOWLER, L.D. PEARLSTEIN, D.D. RYUTOV, J.C. ORTIZ, J.H.T. CLEMENTSON, Lawrence Livermore National Laboratory, J. KING, E.C. MORSE, UC Berkeley, E.D. MEZONLIN, J.A. JOHNSON III, Florida A&M Univ., C.R. SOVINEC, UW-Madison — The Sustained Spheromak Physics Experiment (SSPX) has achieved significant results including peak electron temperature $T_e > 500$eV, magnetic field $B > 1$T, plasma current $I_p \sim 1$MA, and core electron thermal diffusivity $\chi_e < 10$ m^2/sec. Several new operating regimes have demonstrated more efficient building and sustaining of self-organized spheromak magnetic fields. A vigorous collaborative campaign to develop new capabilities for the NIMROD 3D resistive MHD code and benchmark against SSPX data has improved physics understanding and predictive capability. Recent results indicate neutral beam injection is an important next step for evaluating energy confinement and exploring NBI current drive as a means of dynamo-free sustainment. Goals identified for next-generation spheromaks include longer pulses, higher flux amplification through variable bias flux operation, and thinner walls with active feedback control of external tilt/shift modes. Work performed under the auspices of the US DOE by UC-LLNL under contract W-7405-ENG-48.

H.S. McLean
Lawrence Livermore National Laboratory

Date submitted: 24 Jul 2007 Electronic form version 1.4