Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

An Imposed Dynamo Current Drive Experiment: Demonstration of Confinement THOMAS JARBOE, CHRIS HANSEN, AARON HOSSACK, GEORGE MARKLIN, KYLE MORGAN, BRIAN NELSON, DEREK SUTHERLAND, BRIAN VICTOR, University of Washington — An experiment for studying and developing the efficient sustainment of a spheromak with sufficient confinement (current-drive power heats the plasma to its stability β-limit) and in the keV temperature range is discussed. A high-β spheromak sustained by imposed dynamo current drive (IDCD) is justified because: previous transient experiments showed sufficient confinement in the keV range with no external toroidal field coil; recent results on HIT-SI show sustainment with sufficient confinement at low temperature; the potential of IDCD of solving other fusion issues; a very attractive reactor concept; and the general need for efficient current drive in magnetic fusion. The design of a 0.55 m minor radius machine with the required density control, wall loading, and neutral shielding for a 2 s pulse is presented. Peak temperatures of 1 keV and toroidal currents of 1.35 MA and 16% wall-normalized plasma beta are envisioned. The experiment is large enough to address the key issues yet small enough for rapid modification and for extended MHD modeling of startup and code validation.

Thomas Jarboe
University of Washington

Date submitted: 03 Jul 2014 Electronic form version 1.4