Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Overview of the ZaP Flow Z-pinch Experiment SEAN KNECHT, URI SHUMLAK, RAYMOND GOLINGO, BRIAN NELSON, MICHAEL ROSS, MICHAL HUGHES, RACHEL OBERTO, University of Washington — The ZaP Flow Z-pinch experiment is a basic plasma physics experiment that uses sheared axial flows to maintain the gross stability of a Z-pinch plasma. Z-pinches generated are approximately 1 cm in radius, greater than 100 cm long and exhibit stability for many Alfven transit times. Measurements of the axial flow velocity profile indicate low magnetic mode fluctuations are coincident with a sheared profile. The flow profile is uniform near the axis of the pinch with the shear localized near the edges. Investigation of pinch stability in the absence of a close-fitting conducting wall suggests that a wall is not necessary when flow shear is present. Multiple diagnostics indicate evidence of a coherent pinch structure with a length greater than 100 cm that persists for many flow-through times. The effects of adiabatic compression on the pinch are investigated with two electrode configuration. The larger inner electrode is predicted to increase temperature. A two-point Thomson scattering system measures electron temperature and relative electron density at two radial locations. These measurements indicate increased temperature for the larger inner electrode. Ion temperature measurements from Doppler broadening and force balance calculations agree with these measurements.

Sean Knecht
University of Washington

Date submitted: 26 Jul 2011 Electronic form version 1.4