Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

**Impurity Source Studies in TCS** J.A. GROSSNICKLE, H.Y. GUO, G.C. VLASES, University of Washington, RPPL — The original TCS experiment has demonstrated the robust ability to form and sustain FRCs in steady-state using Rotating Magnetic Fields (RMF). RMF parameters set the plasma density, but the temperature was severely limited by radiation, which was determined to be the dominant source of power loss for these plasmas. The total radiated power was strongly correlated with the Oxygen line radiation. This suggests Oxygen is the dominant radiating species. Determining the source of the impurities is an important question that must be answered for the TCS upgrade. Indications are that the primary sources of Oxygen are the stainless steel end cones. A Ti gettering system was installed, however, removal of Oxygen was accompanied by an increase in neutral Hydrogen, which also severely limited performance. These findings factored heavily into the design of the vacuum system and cleaning techniques for the TCS upgrade. The DIVIMP impurity code was modified to run on FRC geometries and showed that core impurity contamination is strongly dependent on electron density and radial transport. Thus, impurity source control is more crucial in TCS than high-density theta pinch formed FRCs.

James Grossnickle

Date submitted: 22 Jul 2005 Electronic form version 1.4