

Abstract Submitted  
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**3-D Plasma Equilibrium Reconstruction at the HSX Stellarator - Current Status and Diagnostic Development**<sup>1</sup> E. CHLECHOWITZ, D.T. ANDERSON, HSX Plasma Lab, University of Wisconsin, Madison, J.C. SCHMITT, Princeton Plasma Physics Laboratory — The equilibrium magnetic field configuration of tokamaks and stellarators can be determined by measuring the plasma current and pressure profile. V3FIT, a three dimensional plasma equilibrium reconstruction code [1], and a set of magnetic pick-up coils have been used to reconstruct HSX equilibria in the past. To discriminate between possible equilibrium solutions, the output from a 10 channel Thomson scattering system has been implemented in the reconstruction algorithm. Furthermore, an upgrade of 50 magnetic diagnostics is planned, measuring poloidal and radial magnetic field components. The positions of the diagnostics have been chosen because of their high signal effectiveness and/or a high ranking in a SVD analysis study [2]. The efficiency of both placement methods can be compared by using subsets of the coils. The number of possible solutions from reconstruction has been drastically reduced, depending on the allowed  $\chi^2$  range [1], using the complete set of coils.

[1] J.D. Hanson et al, Nucl. Fusion 49 075031 (2009)

[2] N. Pomphrey et al, Phys. Plasmas 14, 056103 (2007)

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E. Chlechowicz  
HSX Plasma Lab, University of Wisconsin, Madison

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