

Abstract Submitted
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Optimized Design of Magnetic Diagnostics for Improved Equilibrium Reconstruction on the HSX Stellarator¹ E. CHLECHOWITZ, J.C. SCHMITT, J.N. TALMADGE, D.T. ANDERSON, HSX Plasma Laboratory, University of Wisconsin-Madison — Measuring the plasma current and pressure profile are essential for determining the equilibrium magnetic field configuration of tokamaks as well as stellarators. HSX equilibria have been reconstructed using a three dimensional equilibrium reconstruction code, V3FIT [1], and a limited set of magnetic pick-up coils [2]. Reconstruction can be improved through an upgrade of the pick-up coil set, providing more discrimination between possible equilibrium solutions. For a set of possible equilibria, described by the parameter set P , the signal responses of virtual diagnostics V_S are calculated. The reconstruction is performed by using V_S and $P + \delta P$, with δP as deviations, as initial conditions. A code has been written to minimize the error in reconstruction by optimizing the placement of the coil set using the method of steepest descent. Due to the large dimensionality of the problem the code is being run on grid computing.

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

[2] J.C. Schmitt, Invited talk this conference

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