

Abstract Submitted
for the DPP05 Meeting of
The American Physical Society

Magnetic Field Line Diffusion Footprints on Nonconformal NCSX

First Wall ARTHUR GROSSMAN, UCSD — The magnetic fields of the free boundary equilibria of the NCSX compact stellarator are calculated using VMEC and tabulated both inside and outside the LCMS by MFBE_2001 in a form suitable for field line tracing by both GOURDON and Kisslinger field line diffusion. Poincaré plots of equilibrium configurations from 0 to 4% beta both with and without island healing are made with emphasis placed on the mapping the edge between the LCMS and first wall. Footprints for each configuration on the actual non-conformal wall are found with field line diffusion calculations. Comparison is made with previous conformal wall calculations. It is found that more intersections occur at the close fitting wall at the 60° cross-section than at the tips of the 0° cross-section which has the largest flux expansion of the various cross-sections. Angles of incidence peak in the range $6-12^\circ$. Footprints at low diffusion are similar to the high diffusion ones where step size of field line starting points are determined by anomalous thermal diffusivity. The starting surface is selected to be 1 to 2 cm inside the LCMS, and footprints are found to be independent of starting surface selection. An island structure possibly suitable for an island divertor concept is found in the absence of island healing. Other configurations lack islands in the SOL and may require an ergodic divertor concept. The variation of the footprint with beta and island healing is presented.

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Date submitted: 22 Jul 2005

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