Calculation of the inboard magnetic footprint in the DIII-D from the low mn magnetic perturbation MICHAEL ZHAO, ALKESH PUNJABI, HALIMA ALI, Hampton University — The equilibrium EFIT data for the DIII-D shot 115467 at 3000 ms is used to construct the equilibrium generating function for magnetic field line trajectories in the DIII-D tokamak in natural canonical coordinates [1,2]. The generating function represents the axisymmetric magnetic geometry and the topology of the DIII-D shot very accurately [1,2]. A symplectic map for field line trajectories in the natural canonical coordinates in the DIII-D is constructed. We call this map the DIII-D map. The natural canonical coordinates can be readily inverted to physical coordinates (R,φ,Z) [1,2]. Low mn magnetic perturbation with mode numbers (m,n)=(1,1)+(1,-1) is added to the generating function of the map. The amplitude for the low mn perturbation is chosen to be 6×10^{-4}, which is the expected value of the amplitude in tokamaks. The forward DIII-D map and its continuous analog are used to calculate the inboard magnetic footprint from the low mn perturbation in the DIII-D. This work is supported by US Department of Energy grants DE-FG02-07ER54937, DE-FG02-01ER54624 and DE-FG02-04ER54793.

Alkesh Punjabi
Hampton University

Date submitted: 22 Jul 2010   Electronic form version 1.4