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**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  $(R, \phi, Z)$  [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  $6 \times 10^{-4}$ , 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.

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