

Abstract Submitted
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Tangles of the ideal separatrix from low mn perturbation in the DIII-D TALISA GOSS, WILLIE CRANK, HALIMA ALI, ALKESH PUNJABI, 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 [A. Punjabi, and H. Ali, *Phys. Plasmas* **15**, 122502 (2008); A. Punjabi, *Nucl. Fusion* **49**, 115020 (2009)]. The generating function represents the axisymmetric magnetic geometry and the topology of the DIII-D shot very accurately. 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) . 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 and backward DIII-D maps with low mn perturbation are used to calculate the tangles of the ideal separatrix from 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

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