Effects of magnetic topology on axisymmetric divertors

Halima Ali[1], Alkesh Punjabi[1], and Allen Boozer[2]

[1]Hampton University, Hampton, VA 23668, USA

[2]Columbia University, New York, NY 10227, USA

The effects of the magnetic topology on the size and structure of points of intersection of magnetic flux tubes is studied. Two distinct magnetic topologies are investigated: the open-unbounded and the closed-compact. Open-unbounded magnetic topology is generically represented by the simple map [A. Punjabi, A. Verma, and A. Boozer, *Phys. Rev. Lett*. **69**, 3322 (1992)] and the closed-compact topology represented by the symmetric quartic map [M. Jones et al, *Phys. Plasmas* **16**, 042511 (2009)]. Identical magnetic perturbation is applied in both topologies and field lines are given an artificial radial spiraling velocity. How the loss time, the size, and the structure of the intersection points scale with the spiraling velocity is studied and compared for both topologies; and from this comparison the effects of topology on the axisymmetric divertor are evaluated. This work is supported by the US DOE grants DE-FG02-01ER54624 and DE-FG02-04ER54793 to Hampton University. This research used resources of the NERSC, supported by the Office of Science, US DOE, under Contract No. DE-AC02-05CH11231.