Simulation of Nonresonant Stellarator Divertor with Islands[1]

AYANA CRUTCHFIELD, LARRY LUSTER, MICAH SMITH, ALKESH PUN-JABI, HALIMA ALI, Hampton University, ALLEN BOOZER, Columbia University — Recently a new and efficient simulation method for nonresonant stellarator divertor is developed by Boozer and Punjabi [A. H. Boozer and A. Punjabi, Phys. Plasmas **25**, 092505 (2018)]. In this method, magnetic field lines are given an artificial radial velocity and the strike points of the lines on wall are calculated. The trajectories of field lines with radial velocity are calculated from the Hamiltonian for the field lines using area-preserving maps. The poloidal magnetic flux is the Hamiltonian for the field lines. In nonresonant stellarator divertor, the shape parameters in the Hamiltonian control the shape of the magnetic surfaces. There are three shape parameters which control the elongation, triangularity, and sharp edges on the outermost confining surfaces. It is found that by appropriate choice of shape parameters, it is possible to design a nonresonant stellarator divertor with islands. A wall that covers the islands for all toroidal angles can be designed. The wall is hexagonal in shape. The results on the foot-points on this wall calculated from the simulation method will be presented.

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