Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Hybrid Stellarator Divertor LARRY LUSTER, JESSICA SIMMONS, MIA WILLIAMS, HALIMA ALI, ALKESH PUNJABI, Hampton University, ALLEN BOOZER, Columbia University — Recently an efficient method for simulation of stellarator divertor was developed by Boozer and Punjabi [A. H. Boozer and A. Punjabi, Phys. Plasmas **25**, 092505 (2018)]. This method was used to simulate nonresonant stellarator divertor [A. Punjabi and A. H. Boozer, Phys. Plasmas **27**, 012503 (2020)]. The three parameters denoted by ε_0, ε_t, and ε_x in the Hamiltonian for the trajectories of magnetic field lines control the shape of the outermost confining surface in nonresonant stellarator divertor. These parameters are called shape parameters. They control the elongation, triangularity, and the sharp edges on the outermost confining surface, respectively. In the 2020 Punjabi and Boozer paper on simulation of nonresonant stellarator divertor in PoP, the shape parameters had the values $\varepsilon_0 = \varepsilon_t$ =0.5, and ε_x =-0.31. It is found that in for $\varepsilon_0 = \varepsilon_t$ =0.5, when ε_x is varied in the range -0.25 to -0.1, a new kind of divertor is formed. We call this hybrid divertor. Hybrid divertor has features of both the nonresonant divertor as well as the resonant divertor. The size of the resonant islands varies as ε_x is varied in this range; islands become smaller as $\varepsilon_x \rightarrow$-1/4. In this paper, we give the rotational transforms and sizes of the islands for different values of the parameter ε_x in this range. Work supported by the DOE OFES grants DE-SC0020107 and DE-FG02-07ER54937 to Hampton University, and DE-FG02-03ER54696 to Columbia University. Research used resources of the NERSC, supported by the Office of Science, U.S. DOE, under Contract No. DE-AC02-05CH11231.

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Date submitted: 28 Jun 2020 Electronic form version 1.4