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Effect of Magnetic Islands on Divertors in Tokamaks and Stellarators ALKESH PUNJABI, Hampton University, ALLEN BOOZER, Columbia University — Divertors are required for handling the plasma particle and heat exhausts on the walls in fusion plasmas. Relatively simple methods, models, and maps from field line Hamiltonian are developed to better understand the interaction of strong plasma shaping and magnetic islands on the size and behavior of the magnetic flux tubes that go from the plasma edge to the wall in non-axisymmetric system. This approach is applicable not only in tokamaks but also in stellarators. Stellarator diverters in which magnetic islands are dominant are called resonant and when shaping is dominant are called non-resonant. Optimized stellarators generally have sharp edges on their surface, but unlike the case for tokamaks these edges do not encircle the entire plasma, so they do not define an edge value for the rotational transform. The approach is used in the DIII-D tokamak. Computation results are consistent with the predictions of the models. Further simulations are being done to understand why the transition from an effective cubic to a linear increase in loss time and area of footprint occurs and whether this increase is discontinuous or not. This work is supported by the US DOE grants DE-FG02-01ER54624 and DE-FG02-04ER54793 to Hampton University and DE-FG02-95ER54333 to Columbia University. This research used resources of the NERSC, supported by the Office of Science, US DOE, under Contract No. DE-AC02-05CH11231.

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