Abstract Submitted
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Investigation of High-Recycling Regime in Quasi-Helically Symmetric Geometries[1] A. BADER, D.T. ANDERSON, C.C. HEGNA, J.N. TALMADGE, University of Wisconsin - Madison, Y. FENG, IPP-Greifswald, J.D. LORE, Oak Ridge Nat. Lab. — We simulate the edge region of quasi-helically symmetric (QHS) geometries based on the HSX stellarator in an attempt to understand the accessibility of a high-recycling (HR) regime in island-divertor (ID) geometries. Stellarators with island divertors have typically had difficulty achieving HR, partially due to friction from counter-streaming flows along field lines with long connection lengths.[2] We use the EMC3-EIRENE code to analyze the edge region of stellarators in both QHS geometry and in alternate configurations which employ auxiliary coils to modify the edge island structure. We show that HSX-sized QHS geometries transition to HR at separatrix densities (n_{sep}) between 1.0×10^{13} and 1.0×10^{14} cm^{-3}, with $n_{\mathrm{target}} > n_{\mathrm{sep}}$ at $\approx 1 \times 10^{14}$ cm^{-3}. Furthermore, we show that using auxiliary coils to reduce both the size of the edge islands and the magnitude of the counter-streaming flows can improve divertor performance. In this poster, we explore the role of island size, separatrix temperature and separatrix density on the density and temperature at the targets.

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[2]Y. Feng Nuc. Fus. 49 095002 (2009)

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