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Numerical Characterization of Wall Recycling Conditions of the HIDRA Stellarator using EMC3-EIRENE STEVEN MARCINKO, DAVIDE CURRELI, University of Illinois at Urbana-Champaign — The wall recycling conditions created by energetic bombardment of plasma-facing components (PFCs) are of critical importance to determining the plasma and impurity profile in the edge region of a magnetically confined plasma. In this work a pre-online numerical characterization of the edge plasma in HIDRA has been carried out. HIDRA is the former WEGA experiment, now relocated to the University of Illinois at Urbana-Champaign. Numerical simulations of the HIDRA edge environment are performed utilizing the 3D edge plasma and neutral transport code EMC3-EIRENE [Y. Feng J. Nucl. Mater 241–243, 930 (1997)]. In our analysis, emphasis is placed on the influence of the neutrals and the impurities on edge plasma profiles and thus on energy and particle fluxes impingent onto PFCs. We examine the effect of different wall types, comparing high recycling conditions to situations of low recycling. The effect of intrinsic impurity screening is also taken into account under the expected HIDRA operating regimes. We report the calculated particle confinement time and fluid moments of both plasma and neutrals at the low recycling regimes expected with lithium-based PFCs, and compare them with the high recycling regimes found with conventional metal-based PFCs.

Steven Marcinko
University of Illinois at Urbana-Champaign

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