

Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Numerical Assessment of Plasma Parameters and Surface Flux Scaling in the HIDRA Stellarator STEVEN MARCINKO, DAVIDE CURRELI, Univ of Illinois - Urbana — Pre-online scaling of expected HIDRA operating conditions has been analyzed using EMC3-EIRENE, to which a self-consistent local Bohm-like diffusivity has been added. An inboard and outboard midplane limiter were tested with RF input to core-edge power deposition efficiencies of 10-50% for a 26 kW 2.45 GHz combined RF input discharge. Scaling laws for peak electron temperature, Bohm-like diffusivity, and heat and particle fluxes have been calculated for both low- and high-field discharges; peak electron temperatures, particle diffusivity, and heat fluxes at the outboard limiter were seen to follow approximately a power-law of type $f(P_{RF}) \propto aP_{RF}^b$, with typical exponents in the range $b \sim 0.55 - 0.60$. Higher magnetic fields have the tendency to linearize the heat flux dependence upon the RF power, with exponents in the range of $b \sim 0.75$. Particle fluxes on the outboard limiter are seen to saturate first, and then slightly decline for RF powers in excess of 120 kW in the low-field case and 180 kW in the high-field case.

Steven Marcinko
Univ of Illinois - Urbana

Date submitted: 14 Jul 2017

Electronic form version 1.4