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Modeling the HIDRA Plasma in the Presence of the LiMIT and FLiLi PFCs RABEL RIZKALLAH, STEVEN MARCINKO, DANIEL ANDRUCZYK, University of Illinois at Urbana-Champaign — HIDRA is a hybrid stellarator/tokamak device operated at the Center for Plasma-Material Interactions (CPMI). Its ability to run at steady-state in its classical stellarator configuration allows it to efficiently be used to develop and test innovative plasma facing components (PFCs). Special interest at CPMI involves the study of the plasma interaction with liquid lithium with two PFC concepts, the Liquid Metal Infused Trenches (LiMIT) and the Flowing Liquid Lithium (FLiLi), planned to be installed and tested on HIDRA in various configurations. To this end, it is essential to have a complete knowledge of the HIDRA plasma and magnetic structure. Magnetic flux surface mapping was conducted on HIDRA, from which a complete magnetic grid was generated, incorporating the inherent $n = 1$ error field existing on HIDRA. The grid was used to perform EMC3 simulations of the energy and particle fluxes expected during experimental runs on HIDRA. From the simulations' results, upgrading the heating capability of the machine is being considered to achieve conditions closer to fusion environments. The experimental measurements during the LiMIT/FLiLi campaigns will help benchmark the EMC3 simulations and the EIRENE code will also be used to further study and model the plasma-lithium interaction.

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