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P2.1045 First SOLPS simulations for COMPASS Upgrade tokamak

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COMPASS Upgrade (COMPASS-U) is a medium-size, high-magnetic-field and high-density tokamak project with a flexible set of the poloidal field coils for generation of the single-null, double-null and snowflake divertor configurations. With its high plasma and neutral density, closed divertor and strong ITER-like target shaping, COMPASS-U is of particular interest for ITER in terms of similar divertor plasma and neutral parameters, as well as predicted power decay length and peak power loads to the divertor targets [1]. In this paper, we report on the first simulations of the COMPASS-U divertor plasma by the SOLPS4.3 code package [2]. The first COMPASS-U simulations were performed for pure D plasma with the fixed anomalous cross-field particle D= 0.3 m2s-1 and electron and ion heat e,i = 0.55 m2s-1 diffusivities, which are in the range of the coefficients used in the SOLPS-ITER Alcator C-Mod simulations [3]. The asymmetric double-null magnetic configuration is used with the magnetic equilibrium provided by the FIESTA [4] code for Ip=2 MA, Bt = 5T. The target and first wall are assumed to be metallic (W) with full recycling except for the pumping panels with the recycling coefficient of 0.99. The density and input power scans are carried out for the fixed radial transport coefficients and boundary conditions. The upstream and target profiles of the plasma parameters and the power and particle fluxes to the four targets are compared for different conditions. It is found that the upper divertor is cooler and less dense than the lower one. Comparison of the divertor target loads reveals the divertor asymmetry, high power fluxes to the lower divertor targets which are comparable with the predicted values for COMPASS-U and the relatively small power fluxes to the upper divertor targets. Simulations with different pumping slot position reveal a weak dependence on this parameter. Cases with the reduced cross-field transport inside the separatrix (reproducing the transport barrier) are also simulated and compared to the ones without it. Impurity seeded cases with neon as the radiating impurity are considered. The effect of Ne seeding resulting in a radiative fraction of the order of 30% on the plasma parameters and the fluxes in the divertor is presented and discussed.
[1] R. Panek, et al., Fusion Eng. Des. 123 (2017) 1116;
[2] A.S. Kukushkin, H.D. Pacher, V. Kotov et al., Fusion Eng. Des. 86, 2865 (2011);
[3] W. Dekeyser et al. Plasma and Fusion Research 11, 1403103 (2016);
[4] G. Cunningham, Fusion Eng. Des. 88 (2013) 32383247.

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