Abstract Submitted
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Turbulent Simulations of Divertor Detachment Based On BOUT++ Framework[1] BIN CHEN, XUEQIAO XU, Lawrence livermore national laboratory, TIANYANG XIA, Institute of Plasma Physics Chinese Academy of Sciences, MINYOU YE, University of Science and Technology of China — China Fusion Engineering Testing Reactor is under conceptual design, acting as a bridge between ITER and DEMO. The detached divertor operation offers great promise for a reduction of heat flux onto divertor target plates for acceptable erosion. Therefore, a density scan is performed via an increase of D_2 gas puffing rates in the range of $0.0 \sim 5.0 \times 10^{23}\,s^{-1}$ by using the B2-Eirene/SOLPS 5.0 code package to study the heat flux control and impurity screening property. As the density increases, it shows a gradually change of the divertor operation status, from low-recycling regime to high-recycling regime and finally to detachment. Significant radiation loss inside the confined plasma in the divertor region during detachment leads to strong parallel density and temperature gradients. Based on the SOLPS simulations, BOUT++ simulations will be presented to investigate the stability and turbulent transport under divertor plasma detachment, particularly the strong parallel gradient driven instabilities and enhanced plasma turbulence to spread heat flux over larger surface areas. The correlation between outer mid-plane and divertor turbulence and the related transport will be analyzed.

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