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ELM simulation under CFETR steady state scenario (PhD Oral-24) TENGFEI TANG, SZU,ASIPP,. LLNL, X.Q. XU, LLNL, T.Y. XIA, J.L. CHEN, ASIPP, V.S. CHAN, GA,USTC, G.Q. LI, ASIPP — Grassy ELM regime, a promising steady state operation regime for CFETR (China Fusion Engineering Test Reactor), has better confinement, robust impurity exhaust capability and broad heat flux width in EAST. Key parameters of the CFETR steady state scenario are in the range of experimental scaling law of Grassy ELM regime. However, the mechanism of the Grassy ELM remains unclear. To ensure the steady state operation of CFETR, we need to predict whether the steady state scenario is in the Grassy ELM regime. In this work, we use the BOUT++ code to simulate the onset of the ELM under CFETR steady state scenario. Linear simulation suggests the ballooning mode is unstable, and dominant toroidal mode number is 40. The ELM size is around 0.2%, which is in the ELM size range of the Grassy ELM 0.1%˜1%. Comparing to the crash process of the Type-I ELM, initial crash, turbulence transport and saturation, our simulation results have a smaller initial crash, weaker magnetic perturbation and three phases of the turbulence transport stage. The three phases of the turbulence transport stage are dominant by multi-mode, high-n mode n=45 and low-n mode n=5, respectively. In the first two phase, the pressure perturbation peak inside the pedestal, while peak at the top of the pedestal at the last phase. To evaluate the erosion of the divertor target, the energy fluence at the outer divertor target is calculated, which is 0.029 MJ/m^2, smaller than the tungsten melting limit 0.16 MJ/m^2. .

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