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Transport and turbulence dynamics of ITER SSO plasmas in a grassy-ELM regime[1] XUEYUN WANG, Peking University, XUEQIAO XU, Lawrence Livermore National Laboratory, ZEYU LI, Peking University —

BOUT++ six-field two-fluid transport and turbulence codes are used to investigate the pedestal and SOL turbulent transport dynamics of ITER SSO plasmas. Starting from the initial SSO (Steady-State Operation) scenario profiles with $q_{95} = 5.12$, beta_p=1.57, triangularity =0.48, we use BOUT++ transport code to evolve plasma parameters and radial electric field to steady state. These steady-state plasma profiles are used as initial input profiles to BOUT++ turbulent code, which are further evolved into steady-state turbulence. Simulation results show that under ITER SSO scenario, the most unstable toroidal mode numbers are at intermediate range n=15-20 in linear stage, and the peeling-ballooning mode is the most likely dominated instability. In non-linear stage, the instabilities evolve into grassy ELMs. These results are dramatically different from the ITER 15MA baseline scenario [1], in which ballooning modes mixed with drift-Alfven instability with high toroidal mode numbers dominate in the linear stage, which leads to a large Type-I ELM crash in the non-linear stage. Compared with ITER 15MA baseline scenario, the ITER SSO scenario has approximately one-order-amplitude reduction of divertor heat flux. Parameters that may influence the divertor heat flux width are under investigation. [1] Ze-Yu Li *et al* 2019 *Nucl. Fusion* **59** 04601

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