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Numerical Simulation of SOL-Divertor Plasma Transport for Gas Puffing Operation in the KSTAR Tokamak HYUNSUN HAN, KI MIN KIM, SANG HEE HONG, Dept. of Nuclear Engineering, Seoul National University — A two-dimensional numerical simulation is conducted to investigate the neutral gas puffing effect on the SOL(Scrape-off Layer)-divertor plasma in the KSTAR(Korea Superconducting Tokamak Advanced Research) tokamak. In this simulation, the location of gas puffing is assumed to be in the outer mid-plane of the tokamak while the pumping position is located at a fixed point near the outer divertor in the private flux region. The injection time, period and rate of gas puffing are considered as control parameters in the plasma-neutral transport code developed on the basis of the Braginskii's formulation for plasma and the diffusion model for neutrals. Under the KSTAR baseline operation mode, anomalous particle and energy transport coefficients are modulated to reproduce a situation of high energy flux dumped on the divertor target, like an ELM event. As results of the simulation, the plasma characteristics in a computing domain and the heat flux profiles on the divertor plate are represented for some proposed puffing scenarios. For a gas puffing scenario just before or after the first ELM burst occurs, the peak heat flux on the divertor target appears to be higher than that for no gas puffing case. This means that not only the neutral quantity but the gas injection time is an important factor for the gas puffing to control the heat load on the divertor plate.

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