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Non-linear MHD simulations of pellet triggered ELM for ITER plasma scenarios[1] SHIMPEI FUTATANI, Barcelona Supercomputing Center, GUIDO HUIJSMANS, CEA, IRFM, ALBERTO LOARTE, ITER Organization, MERVI MANTSINEN, Barcelona Supercomputing Center, STANISLAS PAMELA, LUCA GARZOTTI, EURATOM/CCFE, Fusion Association, Culham Science Centre — The non-linear MHD simulations with the JOREK code have been performed to study the dependence of the pellet size required to trigger an ELM in ITER plasma, and also the dependency of the threshold on the pedestal plasma pressure when the pellet is injected. Based on the observation that the pedestal pressure leading to spontaneous ELM triggering is 150 kPa by JOREK simulation, pedestal pressure of 75 kPa and 112.5 kPa have been studied. The JOREK simulation results show that it is necessary to increase the pellet size by a factor of 1.5 of the number of particles in the pellet to trigger ELMs for a pedestal pressure of 75 kPa compared to 112.5 kPa in ITER 15MA/5.3T plasma. In these simulations it has also been found that the magnitude of the ELM energy loss is strongly correlated with the pedestal plasma pressure rather than with the size of the pellet that is required for triggering. The JOREK simulation shows the toroidally asymmetric profile of the heat flux on the outer divertor target due to the pellet triggered ELM which is consistent with the experiment observation of JET. The work contributes the estimation of the requirement of the pellet injection condition to control ELMs in ITER 15MA operation scenarios.

[1]The views and opinions expressed herein do not necessarily reflect either those of the European Commission or those of the ITER Organization.

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