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ELM Mitigation by Noble Gas Injection AHMED HASSANEIN, ISAK KONKASHBAEV, Argonne National Laboratory — Edge-localized modes (ELMs) remain a serious concern for plasma-facing components (PFCs) in the divertor during normal H-mode operation of future tokamaks. ELMs could result in excessive divertor erosion and plasma contamination. Use of high-pressure noble gas is a simple and robust method to mitigate the effects of ELM on the divertor plate. The noble gas cloud above the divertor surface absorbed and reradiated ≈100% of the deposited species energy, correspondingly decreasing heat and particle load onto the divertor plate. This noble gas cloud acts similarly to the well-known vapor shield for low-temperature materials (Be, Li). The high-temperature divertor materials as W has small rate of vapor formation above the divertor surface even for ELM heat load of hundreds MW/m^2, thus puffing radiative gas becomes as necessary mitigated method. This method of using massive noble gas injection was checked on DIII-D for disruption effects mitigation. Nitrogen seeding in the JET gas box divertor Mk-IIAP was used to reduction of the temperature in the front of the divertor target, an indication of ELM mitigation. The possibility of ELM-effect mitigation by a neon cloud puffed above the tungsten divertor surface was studied by the 2DIM MHD code, taking into account radiation transport in the whole diapason of photons, both as lines and continuum. Conditions of strong mitigations of the ITER-relevant ELMs was found. Corresponding neon radiation fluxes onto the opposite PFC are defined for different types of divertors.

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