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Dynamic plasma-wall modeling of ELMy H-mode plasmas A. PIGAROV, UCSD, S. KRASHENINNIKOV, USCD, E. HOLLMANN, UCSD, T. ROGNLIEN, LLNL, E. UNTERBERG, ORNL, C. LASNIER, LLNL — We discuss UEDGE-MB-W version of the 2-D transport code, which incorporates the Macro-Blob (MB) approach to simulate ELM plasma dynamics and various dynamic models for hydrogen inventory in the first wall (W). Results of time-dependent coupled simulations in various sequences of type-I ELMs with UEDGE-MB-W are presented. The temporal evolution of deuterium inventories of the pedestal plasma and wall and the calculated rates of particle deposition into wall during ELMs and of wall outgassing between ELMs are in agreement with experimental data on graphite-wall tokamaks. The fraction of pedestal particle losses deposited into the wall during ELMs is studied found to vary from 20 to 80% depending on the sizes and frequencies of ELMs. Modeling results for discharge exhibiting the transition from small to giant type-I ELMs due to NBI decrease are analyzed, demonstrating the dominant role of wall outgassing in pedestal density built-up. Dynamic deposition/release equilibrium attained in the saturated wall in a sequence of ELMs and the roles of different PSI processes in generating gas release are analyzed. The role of transient events in formation of detached divertor plasma is studied. The dynamics of such plasma is modeled and ionization/recombination/radiation rates are compared to experimental data.

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