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TUNGSTEN NEUTRAL TRANSPORT SIMULATIONS IN LIMITER TOKAMAK PLASMAS ^{*)}

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The scenarios of toroidal current ramp-up include growth of the plasma column cross section near the inner wall, where the vortex electric field strength is higher. Such scenarios can be modeled using the DINA code [1]. The transport of particles and energy in DINA is one-dimensional. Realistically, the plasma limited by the inner wall forms a limiter configuration where ion fluxes beyond the last closed magnetic surface (LCMS) actively sputter the wall surface material. The known problem of contamination of the main plasma with heavy impurities requires improved transport models, particularly inside the LCMS.

This paper considers the transport of tungsten neutrals sputtered from the wall in the limiter configuration of the ITER plasma. The two-dimensional profiles of peripheral plasma parameters with deuterium and tungsten neutrals corresponding to the scenario from the IMAS database [2] were calculated using the SOLPS-ITER package [3]. Also, the transport of tungsten neutrals was calculated using the new two-dimensional Monte Carlo code MCN-2D [4] with several sputtering models. The aim of the work is to evaluate corrections to the LCMS boundary condition for the flow of sputtered tungsten neutrals in the limiting configuration, to check the applicability in this case of the one-dimensional transport models of neutrals implemented in DINA, and to validate the MCN-2D code. A more detailed formulation of the calculations, description of the models used and analysis of the calculation results will be presented in the full version of the report.

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References

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^{*)} [abstracts of this report in Russian](#)