Study of the interaction of helium plasma with tungsten divertor modules in the PLM plasma installation

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Computational modeling of plasma-facing material thermal loads of tokamak reactors including ITER is traditionally performed under assumption that the plasma transfer to the divertor plates and the first wall is ambipolar. However, using this assumption for estimating the heat load on the surface can yield underestimated values for heat flux on the divertor plates. Non-ambipolarity of the particle flux in tokamaks occurs at high values of radial electric fields, in regimes when accelerated electrons escape to the wall, as well as when electric arcs appear on material surface. Experimental studies of such processes with lower costs can be carried out on an experimental installation—a simulator of a divertor plasma, in which the following conditions are attainable: plasma stationarity, intense thermal loads on materials simulating loads at edge-localized modes, technologies for controlling parameters of the plasma-wall interaction. In Russia, MPEI has created such plasma stand—PLM (plasma linear multicasp).

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