INVESTIGATION OF PLASMA SHIELDING DURING TESTING OF MATERIALS IN PLM-M [[1]](#footnote-1)\*)

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Plasma shielding or “detachment” mode can play an important role in the interaction of plasma with divertor plates and wall components facing the plasma in a tokamak reactor. The increasing radiation losses as a result of the influx of impurities from the surface as a result of three-particle recombination lead to the formation of a large number of neutrals in the surface plasma region, which means a decrease in the temperature of the surface plasma and the temperature of the material surface. In the detachment mode, a decrease in the ion flux from the plasma to the surface and an increase in concentration in the screening region are observed, see, for example, [1]. Plasma testing of materials by stationary plasma in the PLM-M installation [2] (linear magnetic trap-plasma linear multicasp) the effects of plasma screening of the surface were recorded. In experiments on PLM-M with stationary helium plasma, with an increase in the flow rate of the working gas, an increase in the sample temperature is observed, then a sharp drop in its temperature is recorded, which indicates the effect of screening the surface by dense plasma and detachment effects. The parameters of the helium plasma discharge: the accelerating voltage at the cathode was 180 V, the pressure of the helium flow into the discharge chamber reached 1 Pa. A diagnostic complex based on Langmuir electric probes and a spectrometer was created to study plasma shielding. Spectrometric measurements of the parameters of the near-surface plasma were carried out using an AvaSpec-ULS2048 spectrometer. The sample temperature is controlled by thermocouples. It is planned to conduct experiments to study the plasma screening of a target by erosion products during the interaction of plasma with a porous nanostructured surface.

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References

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2. V P Budaev et al, J. Phys.: Conf. Ser., 2019, 1383, 012016

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLIX/Mu/ru/CE-Vasiliev.docx) [↑](#footnote-ref-1)