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Formation of the ion distribution function near a surface at a negative potential for gas discharge plasmas ALEXANDER MUSTAFAEV, VLADIMIR SUKHOMLINOV, OSCAR MURILLO, Saint Petersburg Mining University — The self consistent analytic solution of the Boltzmann equation for the ion distribution function (IDF) found in work [1] is used to study the perturbed wall sheath (PWS) formed near a surface at a negative potential. This sheath consists of a quasineutral presheath and a wall sheath where quasineutrality is substantially violated. The dependence of the PWS on plasma parameters and the dependence of the IDF on the charge exchange cross section and the real electron distribution function in plasma are studied. Experimental data of other authors, which had not prior interpretation, is described under the proposed model. It is shown that even in the case when in the wall sheath there are no collisions, the presheath remains experimenting collisions and that when there is no ionization in the PWS, for calculating the saturation current to a flat probe the Bohms criterion is not needed, while it is enough to take into account the edge effects. [1] Mustafaev A, Soukhomlinov V, Murillo O 2018 *Physics of plasmas* Ion energy distribution function in the wall layer at a negative wall potential with respect to the plasma. N. 25, 013513.

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