Application of the multi-particle density functional approach to the properties description of the electron gas of the metal surface with consideration of the periodic structure of metal

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The article is devoted to the application of methods of the perturbation theory in the formalism of many-particle density functionals. The spatial structure of the electron gas near the surface of the metal with the consideration of the periodic structure of the crystal lattice is analyzed. We obtain an analytic expression for the two-particle density function of electron gas in the periodic potential. Results of the work can be used for calculation of the characteristics of the electron gas in solids.

***Keywords*:** *density functional method, non-relativistic Fermi-systems, Eigenvalues, variational methods.*

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