

## **Phase behavior of the model of a cell fluid model with a modified Morse potential**

M.P. Kozlovskii and O.A. Dobush

*Institute for Condensed Matter Physics of the National Academy of Sciences of Ukraine, 1 Svientsitskii Str., 79011 Lviv, Ukraine,  
E-mail: oksana.dobush8@gmail.com*

The influence of including the soft repulsion to the Morse interaction on the phase behavior of the cell fluid model is investigated. The calculation of the grand thermodynamic potential of the model is performed using the method of calculation proposed in [1]. It has been established that the presence of soft repulsion substantially expands the scope of the cell model to describe the first order phase transitions, particularly, in alkali metals. The connection of the values of the parameters of the modified potential of interaction with the coordinates of the critical point is shown, and the state equation is obtained in a wide range of temperatures and densities. It has been established that the potential of this type satisfactorily describes the gas-liquid phase transition. It also provides better agreement with the data of the experiment for the parameters of the critical point, as well as the liquid branch of the coexistence curves of sodium and potassium in comparison with the results obtained for the usual Morse potential [2].

1. Kozlovskii M.P., Dobush O.A., *Condens. Matter Phys.*, 2017, **20**, 23501.
2. Kozlovskii M.P., Dobush O.A., Pylyuk I.V., *Ukr. J. Phys.*, 2017, **62**, 865.