Properties of Small Confined Systems and Macro-Inhomogeneous Systems Under Gravity

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On the basis of the fluctuation theory of phase transitions (FTPT) [1] and the experimental data of the gravity effect for macro-inhomogeneity systems $L>>l_0$, it has been shown [2] that in small confined systems with size $l_0=(0.1-10)$ micrometers in the range of temperature $t=(T-T_c)/T_c=(10^{-5}-10^{-2})$ the gravity effect phenomenon is completely absent. In this context, this phenomenon for macroscopic samples ($L>>l_0$) is proposed to interpret as altitude changes of various properties of thin horizontal layers of spatially homogeneous layers with thickness $l_0=(0.1-10)$ micrometers. For the physical characteristics of such small confined systems ($v_0=l_0^3$) instead of traditionally used inequality $l_0^3>R_c$, it is proposed to use the equation $N_f(s)=N_f(v)$ for the order parameter fluctuations in the surface layer $N_f(s)$ ($s=4\pi l_0^2$) and in the bulk phase $N_f(v)$ ($v=4/3\pi(l_0-2R_c)^3$). The properties of small confined systems $l_0<$.

Considering the similarity of the experimental data of non-monotonic temperature dependences of various properties of the macro-inhomogeneous systems under gravity [2,4] and properties [5] of small confined systems, the equation of small confined systems under critical condition has been proposed based on FTFP [1] and on the gravity effect [2]. The state equation was verified by analysis of experimental data for various properties of small confined systems.

References: