

CALCULATION OF THE He-II QUASIPARTICLE
SPECTRUM WITHIN THE METHOD
OF COLLECTIVE VARIABLES

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S u m m a r y

Using the method of collective variables (MCV), we calculate the logarithm of the ground-state wave function of He-II, $\ln \Psi_0$, to an accuracy of the first correction to the Jastrow function, and also we calculate the wave function $\Psi_{\mathbf{k}}$ of the first excited state and the quasiparticle spectrum of He-II, in the second-order approximation. The functions Ψ_0 and $\Psi_{\mathbf{k}}$ were found as the eigenfunctions of the N -particle Schrödinger equation, and the function Ψ_0 was connected to the structure factor of He-II, using the Vakarchuk equation. The model does not contain any fitting parameter or function. The quasiparticle spectrum calculated numerically agrees well with the experiment. Our solution improves the result obtained early by Yukhnovskiy and Vakarchuk.