## The excitations of atoms in helium system

A.I. Karasevskii

Ukrainian Academy of Sciences, Institute for Metal Physics,36 Vernadsky str.,Kiev,03142, Ukraine

It is shown that the atoms in helium crystals and in the liquid helium can be treated as quantum particles localized in potential wells, created by the atomic potentials of the neighboring atoms. As a result, the state of the atoms in the liquid helium characterized by the discrete spectrum of the energy. This leads to the discrete spectrum of atomic excitations, collective nature of which manifests itself in the formation of the s and p bands ground and excited states of helium atoms, separated by a gap [1,2]. Size of the gap is 8.5 K at T = 0 and decrease with increasing temperature. Presence of a gap allows us to draw the analogy between the physical mechanisms of superfluidity and superconductivity.

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