V. L. Ginzburg. *Superconductivity and Superfluidity (Certain Contemporary Problems)*. Helium, which was discovered on the earth only in 1895, was first liquefied in 1908 (its boiling point at atmospheric pressure $T_b = 4.215\,^\circ$K). Superconductivity was discovered in 1911 (in the case of mercury, for which the critical temperature in the α phase is $T_c = 4.16\,^\circ$K). The fact that the first indication of the existence of the λ transition in liquid helium was obtained in the same year, 1911, is not as well known. Not until 1932 was the λ transition brought out sharply on the heat-capacity curve; the "thermal superconductivity" of helium II was observed in 1935 and, finally, its superfluidity was discovered in 1938. It has since become clear that superconductivity is superfluidity of electrons in a metal, and the term "superfluid" is now often used for both neutral and charged systems in which flow can take place without friction or resistance. In this connection, at least for purposes of instruction, it is especially appropriate to discuss problems of superconductivity and superfluidity simultaneously and from unified premises (the book[1] can be cited as a successful example of such exposition).

Although superfluidity has been under study for many decades, interest in it continues unabated, and the corresponding subject matter is prominent in contemporary physics. Among the factors responsible for this we might point to the steadily increasing technical use of superconductors, the effort to raise T_c and other critical parameters of superconductors, the discovery and study of various subtle effects, especially under nonequilibrium and nonstationary conditions, the investigation of helium II near the λ point, the discovery of the superfluidity of ^{3}He, and the use of the conceptions and theory of superfluids in astrophysics and nuclear physics (it is especially important that the neutron fluid should be superfluid in a rather broad density range).

The paper describes some of the areas listed above as attracting interest at the present time in studies of superconductivity and superfluidity. The following are discussed in concrete terms:

The problem of high-temperature superconductivity (see[2,3] and the references cited there). The problem of superconductivity under nonequilibrium conditions, which opens up an enormous number of new possibilities as compared to the equilibrium case. Examples cited are thermoelectric phenomena[4] and the possible appearance of superconductivity with repulsion between electrons when the level population is inverted[2,5] (concerning nonequilibrium superconductors see also[6]).

The behavior of helium II near the λ point[7]. The speaker also offered a number of remarks pertaining to the superfluidity of ^{3}He (see[8,9]), superfluidity and superconductivity in neutron stars,[10] and the possibility of observing superfluidity in liquid hydrogen (in particular, at negative pressures, i.e., under tension).[11] It must also be stressed that the notions and theory of superfluids have a bearing on certain studies pertaining to the theory of lasers,[12] exciton clusters in semiconductors,[13] and other high-priority physical problems (two-dimensional, quasi-two-dimensional, and quasi-one-dimensional systems deserve special emphasis, e.g., in regard to the observation of superfluidity and superconductivity in these systems; see[4] and its references). All of this subject matter will no doubt be at the center of interest in the immediate future.

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