dynamic experiments (experiments with shock waves). All this shows that knowledge of the changes in the structure of the energy bands of metals with change in density is very important in the reduction of dynamic-experiment data.

As seen from Fig. 6, a clearly pronounced region of negative γ_e is obtained theoretically in aluminum. This phenomenon is connected in this case with the rearrangement of the character of the electronic bands upon compression. At normal density and near it, the sub-band $3d_0$, on which the last electron of aluminum is located, is directed downward and at large k on the Fermi surface the wave function of the electron contains a large admixture of p-states. Following a compression with $\delta \sim 2$, the sub-band $3d_0$ already has a maximum, and the level density on the Fermi surface is larger than at normal density.

As a result of such rearrangement, the cold-compression curve has a noticeable inflection at $\delta = 2$. It is important here that as a result of the rearrangement the value of β increases with increasing density, in some region, reaching a maximum at $\delta \sim 2.4$. Subsequently the sub-bands $3d_0$, $3d_1$, and $3d_2$ move upward simultaneously, their width increases with increasing δ, and β begins to decrease. This means that there is a region of negative γ_e at $1 < \delta < 2.4$, after which γ_e rapidly passes through zero, becomes positive; the $\gamma_e(\delta)$ curve has two extrema, in both the negative and the positive regions. The presence of a region of negative γ_e and of an inflection in the cold-pressure curve should lead to a turning of the shock adiabat of Al to the right at $\delta = 2$. The experimental data obtained in [7,8] show that apparently such a turning of the adiabat does indeed take place near $\delta \sim 2$.

Subsequently, on going into the region of large positive γ_e, one should expect a sharp turning of the shock adiabat of Al to the left. These theoretical premises are presently undergoing a thorough experimental study.

Summarizing the foregoing, we can see that the developed quantum-mechanical theory makes it possible to predict a large set of properties of metals in the compressed state. The developed method makes it possible even now to calculate the electronic rearrangement upon compression, the loss of metallic properties in a definite density interval, and thermal energy and thermal pressure of the electrons.

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