able here from the point of view of experimental observation than for bulky samples.

In conclusion we note that the relations between Ω_0 and Ω_1 in pure superconductors are different than in alloys. This question was already considered in part by Kemoklidze and Pitaevskii [3].

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POSSIBILITY OF DETERMINING THE UPPER LIMIT OF THE NEUTRINO MASS FROM THE TIME OF FLIGHT

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According to contemporary data [1, 2], the upper limit of the mass of the electronic neutrino is $mc^2 \leq 200$ eV. It is possible in principle to obtain the upper limit of the neutrino mass by using remote pulsed neutrino sources and observing the lag of the lower-energy neutrinos behind those of higher energies.

It is shown in [3 - 6] that it is possible to expect in supernova explosions the emission of $\sim 10^{57}$ neutrinos and antineutrinos in a wide spectral region, with about 10 MeV average energy, within a time on the order of several hundredths of a second. The characteristic distance in our galaxy is $L \simeq 10$ kpsec, or $T = L/c \simeq 10^{12}$ sec. The particle covers the distance L within a time $t = L/\beta c = T/\beta$. For ultrarelativistic particles $\beta \simeq 1 = 1/2\gamma^2$, where $\gamma = E/mc^2$. The interval between the arrivals of two simultaneously emitted particles having different energies E_1 and E_2 is

$$\Delta t = t_1 - t_2 \simeq \frac{T}{2}\left(\frac{1}{\gamma_1^2} - \frac{1}{\gamma_2^2}\right)$$

or, if $\gamma_2^2 \gg \gamma_1^2$

$$\Delta t \simeq \frac{T}{2\gamma_1^2};$$

hence

$$mc^2 \simeq E_1 \sqrt{\frac{2\Delta t}{T}};$$

Assuming that in observations of neutrinos emitted from a supernova it is difficult to obtain a value of Δt much smaller than the duration of the neutrino flash ($\Delta t_\gamma \simeq 3 \times 10^{-2}$ sec) [6], we get $mc^2 \lesssim 2$ eV at $E_1 \simeq 8$ MeV. Thus, it is possible to improve the estimate of the upper limit of the neutrino mass by two orders of magnitude compared with the contemporary value.

To observe antineutrino fluxes from a supernova in our galaxy we can use a large amount ($\gtrsim 1000$ tons) of organic scintillator placed in a special underground chamber (to screen it against cosmic rays). When 10^{57} antineutrinos are produced at a distance of 10 kpsec, a particle flux of density 10^{11} particles/cm^2 will strike the earth. With the effective cross section of the reaction $p + \tilde{V} \rightarrow n + e^+$ equal to 6×10^{-42} cm^2, corresponding to an antineutrino energy ~10 MeV, approximately 50 antineutrinos will react in 1000 t of a compound of the $(CH_2)^-_n$ type. The energy of each of the reacting antineutrinos can be determined from the magnitude of the flash produced by the fast positron. It is thus possible, in principle, to determine separately the average arrival times of the neutrinos of lower and higher energies.

Observation of neutrinos from supernovas of neighboring galaxies would greatly shorten the expectation time of the flash, and would make it possible to decrease still further the upper limit of the neutrino mass (owing to the increase of T).

The amount of hydrogen containing matter needed to observe extragalactic neutrino flashes is tremendous (more than 10^6 t). Such an experiment is probably better performed by using not the scintillations of an organic liquid, but the Cerenkov radiation of water deep in the ocean, for which, however, photomultipliers with very large cathode surfaces are needed (with total area $>10^3$ m^2).

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THEORETICAL ANALYSIS OF REACTIONS OF THE (p, pd) TYPE

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The present paper is devoted to a theoretical analysis of new data obtained by the Palevsky group [1] on the momentum spectra of deuterons emitted at a fixed angle to the initial beam in the reactions $He^4(p, pd)H^2$ and $O^{16}(p, pd)N^{14}$ at proton energies 1 GeV. An experiment of this type was first performed at the Joint Institute for Nuclear Research at 675 MeV [2], and showed that a reaction of the (p, pd) type has a quasielastic character. An analysis presented in [3] has made it possible to establish a qualitative agreement between the data of [2] with the pole mechanism. It was also indicated there that the theoretical momentum spectra turn out to be narrower than the experimental ones when account is taken of the finite dimensions of the nucleus.

A similar situation takes place at 1 GeV energy - the pole mechanism predicts a momentum spectrum half as wide as the experimental one (see below) for the deuterons from the reaction $O^{16}(p, pd)N^{14}$, emitted at an angle 4.38° to the direction of the incident protons. Allowance for the excited states of the residual N^{14} nucleus at the given kinematics barely changes the shape of the curve and does not improve the agreement between theory and experiment.

However, contributions to the amplitude of the (p, pd) process are made not only by the pole diagram but also by more complicated diagrams that vary slowly as functions of the mo-