which we obtain all the discontinuities. We give the expression for the discontinuities in the density:

$$\Delta_{\pm}^{(\epsilon)}\rho = \frac{1}{2R}\left\{\frac{c^2V_t^2[\Delta\rho-(\partial\rho/\partial s)_p\Delta s]}{u_{\mp}^2-V^2}-\frac{\Delta H_t^2}{8\pi}\right.$$
$$\left.+\frac{\epsilon\rho V_x^2}{u_{\pm}}\left[\frac{H_t\Delta v_t}{H_x}+\frac{V_t^2\Delta v_x}{u_{\mp}^2-V_x^2}\right]\right\},$$

where

$$R = \sqrt{(V^2+c^2)^2-4c^2V_x^2}\,.$$

The formulas obtained above enable us to determine the signs of $\Delta_{\pm}^{(\epsilon)}\rho$ and in this way to determine the type of wave into which the initial discontinuity breaks up.

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ON A METHOD FOR DETERMINING THE PARITY OF STRANGE PARTICLES

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SINCE parity is not conserved in weak interactions that are responsible for the decay of elementary particles, the intrinsic parity of particles may be determined only from strong interaction processes. On the other hand, due to strangeness conservation,
only the relative parity of strange particles can be determined in strong interactions. This letter discusses an experiment by which the relative parity of K mesons and hyperons may be determined.

Consider the process of absorption of a K^- meson from an s state by a polarized proton with the production of a Y hyperon (Y stands for Λ or Σ) and π-meson:

$$K^- + p \to Y + \pi. \tag{1}$$

In the following it is assumed that the spin of the K-meson is zero and that of the hyperon is $\frac{1}{2}$. Let ξ_K be the intrinsic parity of the K meson, ξ the relative hyperon-proton parity, L the orbital angular momentum of the relative hyperon — π meson motion in their center of mass system, and P_p the degree of polarization of the proton. Conservation of parity and angular momentum in process (1) leads to the relations: $\xi_K\xi = (-)^{L+1}$ and L = 0 or 1. There are two possibilities: (a) $\xi_K\xi = +1$, hence L = 1, and (b) $\xi_K\xi = -1$, hence L = 0.

It is easy to show that: (1) in both cases the hyperons are emitted isotropically; (2) the degree of polarization $P_Y(\theta)$ of the hyperon emitted at an angle θ relative to the direction of polarization of the proton is $P_Y(\theta) = \cos(2\theta)P_p$ in case (a) and $P_Y(\theta) = P_p$ in case (b); (3) the degree of polarization $\overline{P}_Y$ of the hyperon averaged over the emission angle θ is $\overline{P}_Y = -\frac{1}{3}P_p$ in case (a) and $P_Y = P_p$ in case (b). Since parity is not conserved in the decay $Y \to N + \pi$ (N stands for nucleon), the possibilities (a) and (b) can be distinguished and the sign of $\xi_K\xi$ determined by measuring the asymmetry in the angular distribution of the decay π mesons.

The experiment described can also be performed with polarized nuclei. Let the nuclear spin j be determined entirely by one nucleon N outside a closed subshell (or by a "hole" in a subshell) and suppose that as a result of capture of a K^- meson, from an s state, a hyperon and π meson are emitted by this nucleon and the daughter nucleus suffers no recoil. Conservation of parity and angular momentum leads then to the relations $\xi_K\xi = (-)^{L+l+1}$ (l is the orbital angular momentum of the nucleon in the nucleus) and $L = j - \frac{1}{2}$ or $j + \frac{1}{2}$. A simple calculation shows that for $L = j - \frac{1}{2}$, $\overline{P}_Y = P_n$ and for $L = j + \frac{1}{2}$, $\overline{P}_Y = -P_n/(j+1)$ where P_n denotes the degree of polarization of the nucleus. Clearly, due to parity conservation, for a given j and l the two values $\xi_K\xi = +1$ and -1 will correspond to different values of L. It should be noted that the indicated values of $\overline{P}_Y$ will be decreased due to the background of unpolar-

ized hyperons resulting from the absorption of K^- mesons by nucleons from filled shells of the nucleus, however the sign of $\overline{P}_Y$ will persist.

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HEAT OF MIXING OF LIGHT AND HEAVY WATER

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IT seems at first glance that the thermal effect in mixing H_2O and D_2O should be very small, since a mixture of molecules of different isotopes could be considered to a high degree of approximation as an ideal solution. But account must be taken of the chemical interaction between the molecules of the initial substances:

$$H_2O + D_2O \rightleftarrows 2HDO. \tag{1}$$

A value $K = 3.26$ is usually taken[1] for the equilibrium constant of the above reaction in the liquid phase. This means that when one mole of H_2O and 1 mole of D_2O are mixed, 0.95 moles of HDO is formed.

The properties of the H_2O and D_2O molecules have been investigated in sufficient detail, but the same cannot be stated with respect to the molecules of HDO, since they always occur mixed with H_2O and D_2O. If the heat of mixing q of light and heavy water and the equilibrium constant of the reaction (1) are known, the heat of formation q' of HDO, when H_2O and D_2O react in the condensed phase, can be determined directly, and certain conclusions can be drawn from this regarding the difference in the zero-point energies of the different isotopic forms of water molecules.

The heat of mixing of H_2O and D_2O (99.7%) was determined in a hermetically sealed reversing calorimeter provided with a heater and a thermistor. A cooling of the system (by $\approx 0.3°C$) was observed on mixing (up to a molecular concentration of deuterium $n \approx 0.5$). The temperature of the external container was adjusted to the temperature of the calorimeter. The correction for heat exchange did not exceed 2.5% of the magnitude of the effect observed. The thermal capacity of the system was

determined in the course of the experiment.

As the result of experiments (at 24°C) the following value for the heat of mixing (heat is absorbed) was obtained for the case $n = 0.50$, taking into account possible errors: $q = 7.92 \pm 0.25$ cal/mole.

If we assume the equilibrium constant for the reaction (1) in the liquid phase to be equal to 3.26, we shall obtain for the heat of formation of 1 mole of HDO (not taking into account the effect due to the heavy isotope of oxygen O^{18}) the value $q' = 16.7 \pm 0.5$ cal/mole. This value can be compared with the results of calculations for the gas phase. To do this, we make use of the theoretically calculated dependence of the equilibrium constant on the temperature,[2] and the well-known thermodynamic relation[3]

$$\partial \ln K / \partial T = \Delta H / RT^2, \quad \Delta H = 2q'.$$

From this we obtain $q' = 34$ cal/mole. A decrease in the heat of formation of HDO in the condensed phase, compared with the gaseous phase, may be due to a strong intermolecular interaction in solution and to the associated change in the zero-point energies.

I express my gratitude to V. M. Kostin for his help in carrying out the experiments.

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MEASUREMENT OF β-γ CORRELATION FROM ORIENTED NUCLEI

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IN connection with the problem of nonconservation of parity, it has been shown by Dolginov[1] and others[2,3] that in an allowed transition the investigation