It is seen from this expression that the contribution of the regenerated K_2^0 mesons to the intensity depends exponentially on the position of the regenerator. By measuring the intensity under conditions when the contribution of the regenerated K_2^0 mesons is large (at $\Gamma_1 t_1 \sim 2$ and in the presence of a thick regenerator this contribution may amount to 10%) and when it is negligibly small (at $\Gamma_1 t_1 \sim 8 - 10$), we can find the phase ϕ_ρ (and by the same token the regeneration phase)

$$\cos(\phi_\rho + \Delta m t_1) = \left\{ \frac{I_1}{I_2} e^{-\Gamma_2 t_1'} - e^{-\Gamma_2 t_1} - |\rho|^2 e^{-\Gamma_1 t_1} \right\} \frac{e^{\Gamma_1 \frac{t_1}{2}}}{2|\rho|} .$$

Here I_1 and I_2 are the intensities measured under the condtiions listed above, and t_1' is the time of flight of the particle from the source to the regenerator during the measurement of I_2. It is assumed that Δm is known.

Measurement of $|\rho|$ can be carried out in a beam of pure K_2^0 mesons (cf., e.g., Faissner et al. [4]).

We note that the regeneration phase can be determined, independently of the phases of the CP-violation parameters, from the time dependence of the charge asymmetry of the decays $K_2^0 \to \pi^\pm \ell^\pm \nu(\bar{\nu})$ behind the regenerator [5]. An advantage of the experiment proposed by us is that there is no need to plot the interference curve, and it suffices to measure the intensities I_1 and I_2, say of the decay of a long-lived K^0 meson into three pions.

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CONCERNING THE PROBLEM OF THE A_2 MESON

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1. The observation of the splitting of the A_2 meson into two components, A_2^L and A_2^H [1], and the absence of such a splitting in the case of K*(1400) [2] from the same 2^+ nonet (in the SU(3) scheme) leads to significant difficulties for the SU(3) symmetry scheme itself and for the quark model [3]. In any case, the most important problem [3] is whether the quantum numbers of A_2^H and A_2^L are the same or different. It must be emphasized that the usual methods of determining the quantum numbers presuppose a priori the existence of resonances (unstable particles) whose quantum numbers are to be determined. Therefore, the

problem of determining whether the A_2^L and A_2^H mesons exist is no less important.

2. In view of the fact that the analytic continuation into the complex plane is not valid, the use of only the mass distribution to prove the existence of resonances (unstable particles) is not allowed in principle [4]. To solve such a problem, it is necessary to "enhance" the fact of existence of the resonance, by investigating effects that are infinitely sensitive to singularities of the mass distributions in the complex domain. Such an enhancement is possible in the study of the law governing the decay (at large values of the time) or the cross section of the reaction in the crossing channel (at high energies) [4]. To solve the problem of the A_2 meson it is natural to use an investigation of the asymptotic behavior (at high energies) of reactions in whose crossing channel only states with quantum numbers of A_2 ($I^G = 1^-$, $J^P = 2^+$) can be exchanged.

3. We consider by way of an example the reaction $\pi^- p \to \eta n$, in whose crossing channel only exchange of states with the quantum numbers A_2 is possible [5]. At high energies ($s \to \infty$) we have

$$\frac{d\sigma(\pi^- p \to \eta n)}{dt} = |A_{A_2}^{(i)}(s,t)|^2, \tag{1}$$

where

$$A_{A_2}^{(1)}(s,t) \approx \gamma_{A_2}(t)\,\frac{1+e^{-i\pi\alpha_{A_2}(t)}}{\sin\pi\alpha_{A_2}(t)}\,s^{\alpha_{A_2}(t)-1}, \tag{2a}$$

if A_2 is a simple resonance (first-order pole), $\gamma_{A_2}(t)$ is the residue and $\gamma_{A_2}(t)$ is the trajectory of this pole, and

$$A_{A_2}^{(2)}(s,t) \approx \gamma_{A_2^L}(t)\,\frac{1+e^{-i\pi\alpha_{A_2^L}(t)}}{\sin\pi\alpha_{A_2^L}(t)}\,s^{\alpha_{A_2^L}(t)-1} + \gamma_{A_2^H}(t)\,\frac{1+e^{-i\pi\alpha_{A_2^H}(t)}}{\sin\pi\alpha_{A_2^H}(t)}\,s^{\alpha_{A_2^H}(t)-1}, \tag{2b}$$

if A_2 is split into two simple resonances A_2^L and A_2^H with the same quantum numbers ($I^G = 1^-$, $J^P = 2^+$, and finally

$$A_2^{(3)}(s,t) \approx \gamma_{\tilde{A}_2}(t)\,\frac{1+e^{-i\pi\alpha_{\tilde{A}_2}(t)}}{\sin\pi\alpha_{\tilde{A}_2}(t)}\,s^{\alpha_{\tilde{A}_2}(t)-1}\ln s + \zeta_{\tilde{A}_2}(t)\left[\frac{1+e^{-i\pi\alpha_{\tilde{A}_2}(t)}}{\sin^2\pi\alpha_{\tilde{A}_2}(t)}\cos\pi\alpha_{\tilde{A}_2}(t) - i\,\frac{e^{-i\pi\alpha_{\tilde{A}_2}(t)}}{\sin\pi\alpha_{\tilde{A}_2}(t)}\right]s^{\alpha_{\tilde{A}_2}(t)-1} \tag{2c}$$

if A_2 is a dipole $\tilde{A}_2$ with quantum numbers ($I^G = 1^-$, $J^P = 2^+$) and produces two mass-distribution peaks (but not two resonances!). A careful study of

$d\sigma(\pi^- p \to \eta n)/dt$ as a function of s and t in as large an interval of t as possible at the maximum possible s, on the basis of (2), will provide the answer to the question of how many A_2 mesons there are and what are their quantum numbers. It is necessary to use for this purpose, in addition, such reactions as $K^{\pm}N$ scattering [6] and the charge exchanges $K^- p \to \bar{K}^0 n$ and $K^+ n \to K^0 p$ [7]. This is necessary for an independent estimate of the contributions of singularities such as cuts. It is natural to use different variants of FESR for these reactions [6]. We note that it is possible to investigate in this manner also the proposed model of the solution of the A_2 problem involving "exotic" resonances [8]. The observation of the regimes (2b) and (2c) would refute this model.

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LOCALIZED EXCITATIONS IN CRYSTALS WITH DISLOCATIONS

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The question of localization of excitations near a linear defect in a crystal (dislocation) has been considered in the literature many times. Usually its analysis is associated with the role of strong distortions of the crystal structure in the nucleus of the dislocation, which in the case of long waves (compared with the lattice constant) can be described by a δ-function perturbation on its axis. The occurrence of local phonon states is governed in this case by the sign of such a perturbation and leads to the appearance of levels that are separated by an exponentially small gap from the corresponding section of the continuous spectrum [1]. However, besides the strong distortion of the crystal in the nucleus of the dislocation, there exists a slowly decreasing deformation field at large distances from its axis. As indicated in the review of Lifshitz and Kosevich [1], such a field serves, generally speaking, as a "trap" for the short-wave phonons, and this should also lead to the appearance of a spectrum of discrete states in a certain region near the dislocation. In this paper we determine the spectrum of these states.

As is well known, quasiparticles (phonons, excitons, magnons) are characterized by a dispersion law $\varepsilon = \varepsilon(\vec{k})$ whose form depends on the symmetry of the crysdtallattice and is represented by the Fourier transform of the matrix of the corresponding interaction $M(\vec{r} - \vec{r}\,')$. Near the edges of the band we have

$$\epsilon(k) = \epsilon_0 + (\hbar^2 k^2/2m^*),$$

where m^* is the effective mass of the quasiparticle and can be either positive or negative.