$d\sigma(\pi^- p \to \eta n)/dt$ 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.

If the z axis is chosen in the direction of the dislocation, then k_z is a good quantum number and it is convenient to employ the mixed representation $(k_z, \vec{\rho})$, where $\vec{\rho}$ is the radius vector in the plane z = const.

Far from the dislocation, where the lattice deformation $u_{i\ell}(\vec{\rho})$ varies slowly over distances that are large compared not only with the lattice constant, but also with the quasiparticle wavelength, it is necessary to add to the Hamiltonian $\hat{H}_0$ of the ideal crystal the term

$$g_{i\ell}(k_z)u_{i\ell}(\vec{\rho}) .$$

To take into account the influence of the nuclear part of the dislocation, it is necessary to include in the Hamiltonian $\hat{H}$ of the crystal with the defect one additional term of the type $g_0(k_z)f(\vec{\rho})$, where $f(\vec{\rho})$ decreases rapidly with increasing distance from the dislocation axis. If the conditions $\kappa a \ll 1 \ll k\rho$ are satisfied (a is the lattice constant and $\kappa = (k_x, k_y)$), then, in view of the foregoing, we get

$$\hat{H} = \hat{H}_0 + g_{i\ell}(k_z)u_{i\ell}(\vec{\rho}) + g_0(k_z)\delta(\vec{\rho}), \tag{1}$$

$$\hat{H}_0 = \epsilon(\hat{\kappa}, k_z) \equiv \epsilon_0 - \frac{\hbar^2}{2m^*}\Delta_{\vec{\rho}} .$$

In the case of an elastically-isotropic crystal, the second term of (1) takes the form $g(k_z)u(\rho)$, where now $u \equiv u_{\ell\ell} \sim (\cos\phi)/\rho$ (ϕ is the angle in the plane z = const). Thus, $g(k_z)u(\vec{\rho})$ is a quantity with alternating sign, and its integral taken over a region where this term is negative diverges. This means that there exists an infinite number of discrete levels with a condensation point at "zero" (we are using a level with fixed k_z as a reference). These levels can be considered quasiclassically, i.e., it is possible to omit the lasteterm of (1) in their analysis.

If S(E) is the area on which

$$U \equiv g(k_z)u(\rho) < E \equiv \epsilon - \epsilon_0 - \frac{\hbar^2 k_z^2}{2m^*} ,$$

and $\nu_0(E)$ is the spectral -ensity per unit area at U = 0, then the spectral density per unit area $\nu(E)$, for a sufficiently smooth potential well U, will be

$$\nu(E) \equiv dN/dE = \int_{(V<0)} \nu_0(E - U)\, dS(U) .$$

Since in the planar case we have

$$\epsilon(\vec{\kappa}) = \hbar^2\kappa^2/2m^* \text{ and } \nu_0(E) = 2\pi m^*/\hbar^2,$$

it follows that

$$dN/dE = (2\pi m^*/\hbar^2)S(E) .$$

To determine S(E), we note that the limits of the region S(E) are determined from the equation U = E, which yields

$$\rho = g(k_z)\frac{\cos\phi}{E} ,$$

whence

$$S(E) = \int \frac{\rho^2}{2} d\phi = \frac{g^2(k_z)}{2E^2} \int_0^{\pi} \cos^2\phi \cdot d\phi = \frac{\pi g^2(k_z)}{4E^2} ,$$

where the integrals are taken over the region where $\cos\phi > 0$.

We thus get for the spectral density $\nu(E)$

$$\nu(E) = dN/dE = A(k_z)/E^2 \text{ where } A(k_z) = \pi^2 m^* g^2(k_z)/\hbar^2$$

and

$$N(E) = -A(k_z)/E \quad .$$

Consequently, the discrete levels form a sequence that decreases like

$$E_N = -\frac{A(k_z)}{N} + 0\left(\frac{1}{N^2}\right) . \qquad (2)$$

Concerning the occurrence of localized states near the dislocation itself, we can state the following: if the perturbation produced by the nucleus of the dislocation is sufficiently large, then the levels due to the perturbation are "deep" and lie lower than the first level determined by (2). Near the boundary of the spectrum of an ideal crystal, the local level is produced with energy

$$E_0 = -\frac{\hbar^2 \kappa_0^2}{2m^*} \exp\left(-\frac{2\pi\hbar^2}{m^* g_0(k_z)}\right)$$

(κ_0 is a constant on the order of the limiting wave vector of the quasiparticle). Since the width of the band of an ideal crystal is

$$\Delta E_{id} = \frac{\pi^2\hbar^2}{2|m^*|} ,$$

it follows that separation of the "deep" level E_0 from the levels (2) occurs under the condition

$$2\left(\frac{\kappa_0}{\pi^3}\right)^2 \left(\frac{\Delta E_{id}}{g(k_z)}\right)^2 << \exp\left(-\frac{4}{\pi}\frac{\Delta E_{id}}{g_0(k_z)}\right).$$

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TIME OF START OF SCREENING OF A SURFACE EVAPORATING UNDER THE INFLUENCE OF LASER RADIATION

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The breakdown of a cold gas under the influence of a laser beam is a well-known phenomenon, for which a theory has already been developed (for a description of the phenomenon and for a review of the initial investigations, see [1]). It is of interest to investigate the analogous phenomenon, the heating of the vapor produced under the influence of a laser beam, together with the