

20 Mev (but above 0.01 Mev) the He^4 nucleus captures the K meson in the s state [or in the p state, if $\pi = -(-1)^i$] by some specific (non-electromagnetic) short-lived forces.

At greater K-meson energies the correlation formulas are the same, but are valid only for reaction products making small angles with the direction of the incident K meson.

Cascade (2) does not permit determination of the spin of the K meson, and the effect of $k \neq 0$ on the discussed correlations relative to θ can be investigated only qualitatively. If $k \neq 0$, the correlation corresponding to a given i becomes less anisotropic, smoothes out, and thereby yields too low values of the hyperfragment spins.

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RADIATION FROM AN ELECTRON TRAVERSING A SLAB

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WHEN an electron moves in an inhomogeneous medium it radiates. If its velocity is greater than the phase velocity of light, it will also emit Cerenkov radiation. The radiation emitted by an electron moving at right angles to the boundary between two media was first investigated by Ginzburg and Frank¹ (see also Refs. 2 and 4). In the present paper we wish to communicate the results of calculations on the angular distribution of the radiation emitted by a charge moving perpendicularly to a slab placed in a vacuum.

The energy emitted into the half-space in front of the slab ($z < 0$) is as follows:

$$W = \frac{2e^2v^2}{\pi c^3} \int_0^\infty d\omega \int_0^{\pi/2} \sin^3 \vartheta \cos^2 \vartheta |A(\omega, \vartheta)|^2 d\vartheta, \quad (1)$$

$$A(\omega, \vartheta) = (\epsilon' - 1) [e^{-ixd\omega/c} (1 + \beta x)(x - y)(1 - \beta^2 - \beta x) + e^{-ixd\omega/c} (1 - \beta x)(x + y)(1 - \beta^2 + \beta x) - 2xe^{id\omega/v} (1 - \beta \cos \vartheta)(1 + \beta \cos \vartheta - \epsilon'\beta^2)] [e^{-ixd\omega/c} (x - y)^2 - e^{ixd\omega/c} (x + y)^2]^{-1} (1 - \beta^2 \cos^2 \vartheta)^{-1} (1 - \beta^2 x^2)^{-1}; \quad (2)$$

$$x = \sqrt{\epsilon' - \sin^2 \vartheta}, \quad y = \epsilon' \cos \vartheta.$$

The z axis is in the direction of the moving electron; d is the thickness of the slab, whose dielectric constant ϵ' may be complex (if there is absorption);* ϑ is the angle between the z axis and the direction of observation.

The angular distribution of the radiation behind the slab (in the half-space $z > d$) is obtained by replacing v by $-v$. If d is allowed to increase to infinity, and at the same time the absorption is taken to be finite, with $\text{Re}(ix) > 0$, then the formula above reduces to the result of Ginzburg and Frank† for the radiation emitted by an electron flying into an infinite medium.

Analysis of the solution shows that for a nonrelativistic electron the angular distribution of the radiation is the same in the forward direction as it is in the backward direction. For a thin slab ($d \ll \omega\sqrt{\epsilon'/c}$), the angular distribution of the radiation emitted by a nonrelativistic electron turns out to be the same as the angular distribution of the radiation from an oscillating dipole; in the most favorable case, i.e., for

$\omega d/v = \pi(2n + 1)$, the energy of the radiation is much greater than it is when only one boundary is present.

If the slab thickness is greater than the wavelength, interference maxima occur. These are due to multiple refractions of the radiation at the boundaries and interference between the radiation emitted at the first and second boundaries.

If the electron speed is such that $\epsilon\beta^2 > 1$, Cerenkov radiation will be emitted in the slab. It can be internally reflected, and then the characteristic maximum will not be observed. If the conditions for internal reflection are not satisfied, then there will be a sharp maximum at an angle ϑ given by

$$\beta^2 (\epsilon - \sin^2 \vartheta) = 1, \quad (3)$$

The height of the maximum will depend on the Cerenkov radiation. The angle determined by (3) characterizes the Cerenkov cone, refracted at the boundary.

Quantitative comparisons between the theory of Cerenkov radiation and experiment have been made using slabs; some discrepancies were found. Our solution is exact, and a more reliable comparison with experiment can therefore be made. In addition, the process might be interesting as a microwave generator, but this awaits further investigations.

The author is grateful to V. L. Ginzburg, I. M. Frank, and B. M. Bolotovskii for discussions of his results.

*Where the dielectric constant is written without a prime, the slab is taken to be transparent.

†The final results in Refs. 1 and 2 have a misprint in the sign.

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INFLUENCE OF ELECTROSTATIC FIELD ON THE ABSORPTION OF SOUND IN ROCHELLE SALT

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WE recently reported anomalous absorption of sound in Rochelle salt, observed by us at a temperature near its upper Curie point.¹ This absorption takes place for a transverse elastic wave propagating along the crystallographic z axis and polarized along the y axis. An examination of the piezoelectric properties of Rochelle salt shows that the shear strains connected with the propagation of this wave cause polarization of the crystal along its ferroelectric x axis. It is therefore important to investigate the absorption of the same waves in the case when a crystal is already polarized beforehand by an external electrostatic field directed along the same x axis.

The absorption of sound was measured by the pulse method. An oscillograph was used to record the amplitudes of the ultrasonic pulses passing through a Rochelle salt crystal. The pulse duration was 1.5 milliseconds and the oscillation frequency was 5 Mc.

Our experiments have shown that at temperatures above the Curie point, when the crystal loses its ferroelectric properties, absorption of sound is practically independent of the external field. At temper-