\[ a = \frac{2m}{\hbar^2} \beta_2 \frac{m}{2\pi \hbar^2} \frac{1}{l} = k_{2z}^2 \sin^2 \theta, \]

\( \theta \) is the angle of incidence of the wave.

The expression, analogous to (11), with \( \varepsilon = 0 \) has the form

\[ |\beta|^2 \approx 1 - \frac{(k_{2z})^2}{6\pi} \frac{\beta_2 \cos \theta}{x_2^2}. \]  

(13)

In the case of isotropic inhomogeneities, the attenuation of a coherent wave due to noncoherent scattering at inhomogeneities is not as effective as in the case of a laminar inhomogeneous medium.

The authors wish to express their deep gratitude to Yu. A. Kravtsov and S. M. Rytov for their interest in the work.

**LITERATURE CITED**

Here \( J_\omega(0, 0, 0) \) is the linear density of the charge \( q \) and \( 2L \) is the length of the filament (in the final results we shall assume that \( L \to \infty \)). The point of intersection moves with the velocity \( (v_x, v_y, 0) \); here \( v_y = v / \tan \phi \) can be made arbitrarily great. We assume that the velocity \( v_x = \omega \cos \phi \) can be made arbitrarily great.

Summing the field of the passing radiation of all the elementary sections of the filament, at sufficiently great distances \( R \gg L \), in the limiting case of an infinitely long filament we obtain the Fourier component of the Hertz vector for \( \omega > 0 \) in a medium with \( \epsilon_i \) (i = 1, 2) in the form

\[
F_{i, 5}(x) = \frac{\pi}{\epsilon_i} \sin \theta_i \sin \phi \frac{\cos \theta + \sin \theta \sin \phi}{\sqrt{1 - (v/c) \sin \theta_i}} \frac{1}{\sqrt{1 - (v/c) \cos \theta_i}} \frac{F_1(\sin \theta \cos \phi) \delta \left[ \nabla + \omega \left( \frac{\omega}{c} \right) \cos \theta - 1 \right]}{\ell \sin \theta_i \cos \phi} \]  

(3)

in (3) the upper signs correspond to the first index. In the derivation of (2) account was taken of the limit \( \lim_{L \to \infty} \frac{\sin \theta_i}{\pi} = 0 \).

The density of the energy radiated in unit time in a unit interval of frequencies in the solid angle \( d\Omega = \sin \theta d\theta d\phi \) in a medium with \( \epsilon_i \) is equal to

\[
\frac{dW_n}{d\Omega} = \frac{2q^2 \omega}{\epsilon_i c \sin \theta} \left| F_1(\sin \theta \cos \phi) \right|^2 \times
\]

\[
\times \left( \cos \theta + \sin \theta \sin \phi \right) \delta \left( \nabla + \omega \left( \frac{\omega}{c} \right) \cos \theta - 1 \right) \right] d\Omega = \frac{2q^2 \omega}{\epsilon_i c \sin \theta} \left| F_1(\sin \theta \cos \phi) \right|^2 \times
\]

\[
\times \left( \cos \theta + \sin \theta \sin \phi \right) \delta \left( \nabla + \omega \left( \frac{\omega}{c} \right) \cos \theta - 1 \right) \right] d\Omega = \frac{2q^2 \omega}{\epsilon_i c \sin \theta} \left| F_1(\sin \theta \cos \phi) \right|^2 \times
\]

\[
\times \left( \cos \theta + \sin \theta \sin \phi \right) \delta \left( \nabla + \omega \left( \frac{\omega}{c} \right) \cos \theta - 1 \right) \right] d\Omega = \frac{2q^2 \omega}{\epsilon_i c \sin \theta} \left| F_1(\sin \theta \cos \phi) \right|^2 \times
\]

(4)

In (2) and (3), \( J_n(z) \) is a Bessel function of order \( n \). This expression, in the case of the fall of a filament from a vacuum on an ideal conductor, coincides with the result obtained by S. V. Afanas'ev (private communication).

The first term in (4) describes the energy of the radiation by Cerenkov waves; for a sufficiently great velocity \( v > c/\sqrt{\epsilon_i} \), the Cerenkov effect is observed in any arbitrary medium. For \( a = 0 \), the intensity of the Cerenkov radiation is maximal and coincides with the energy of the radiation of a moving superlight source, uniformly and rectilinearly [6]. The dependence of the intensity on the azimuthal angle \( \phi \) is expressed by the formula

\[
\frac{dW_n}{dt} = \frac{2q^2 \omega}{\epsilon_i c \sin \theta} \left( \cos \theta + \sin \theta \sin \phi \right) \left( 1 - \frac{\omega^2}{c^2} \right) \left| F_1(\cos \theta \cos \phi) \right|^2 \times
\]

(5)

As can be seen, the Cerenkov radiation density reverts to zero for some frequencies and angles \( \phi \), for which the argument \( (\omega/c) \sqrt{\epsilon_i} \sin \theta \sqrt{1 - c^2/v^2} \) is a zero function \( J_n(z) \).

The second term in formula (4) describes the energy of the radiation of an undulator, arising with a given velocity \( v \). The radiation takes place at the Doppler frequencies \( \omega = n\Omega/\ell - (v/c) \sqrt{\epsilon_i} \cos \theta \); with a sufficiently great velocity \( v > c/\sqrt{\epsilon_i} \), an anomalous Doppler effect can, in principle, be observed in any given medium.

The intensity of the radiation at the \( n \)-th harmonic is

\[
\frac{dW_n}{dt} = \frac{2q^2 \omega^2}{\epsilon_i c \sin^2 \phi} \left( \cos \theta + \sin \theta \cos \phi \right) \left| F_1(\cos \theta \cos \phi) \right|^2 \left( \frac{\omega}{c} \right) \sqrt{\epsilon_i} \sin \theta \cos \phi \times
\]

(6)

\[
\left( 1 - \frac{\omega^2}{c^2} \right) \left( \frac{\omega}{c} \right) \sqrt{\epsilon_i} \sin \theta \cos \phi \times
\]

\[
\left( 1 - \frac{\omega^2}{c^2} \right) \left( \frac{\omega}{c} \right) \sqrt{\epsilon_i} \sin \theta \cos \phi \times
\]