where

$$n_{1,2}^2 = \{(ag - a^2)\varepsilon_1 + ag(\varepsilon_1 - \varepsilon_3) + b^2\varepsilon_1 + (\varepsilon_1^2 a - \varepsilon_2^2 a + \varepsilon_1\varepsilon_3 g)\beta^2 \pm [(\varepsilon_1^2 a - \varepsilon_2^2 a - \varepsilon_1\varepsilon_3 g)^2\beta^4 - 2a\varepsilon_1(\varepsilon_3 g - \varepsilon_1 a)^2\beta^2 + 2a^2\varepsilon_2^2(\varepsilon_1 a + \varepsilon_3 g)\beta^2 + 2b^2\varepsilon_1(a\varepsilon_1^2 - a\varepsilon_2^2 + g\varepsilon_1\varepsilon_3)\beta^2 - 8abg\varepsilon_1\varepsilon_2\varepsilon_3\beta^2 + (g\varepsilon_3 - \varepsilon_1 a)^2 a^2 + b^2\varepsilon_1(b^2\varepsilon_1 - 2a^2\varepsilon_1 + 2ag\varepsilon_3)]^{1/2}\} / 2\varepsilon_1 ag\beta^2,$$

$$a = \mu_1/(\mu_1^2 - \mu_2^2), \quad b = \mu_2/(\mu_2^2 - \mu_1^2), \quad g = 1/\mu_3.$$

The regions of integration are determined by the following inequalities (cf. reference 3):

$$\mathrm{I}: \beta^2 n_m^2 > \beta^2 n_1^2 > 1, \quad \mathrm{II}: \beta^2 n_m^2 > \beta^2 n_2^2 > 1.$$

In the case of a non-gyrotropic uniaxial crystal ($\epsilon_2 = b = 0$) we have

$$-d\mathscr{E}/dz = \mu_0^2 v^{-4} \int\limits_{\mu_3(\varepsilon_1\mu_1\beta^2 - 1)/\mu_1 > 1} \omega^3 d\omega \cdot \mu_3^2(\varepsilon_1\mu_1\beta^2 - 1)/\mu_1.$$

From the above it is apparent that the radiation intensity for an anisotropic dielectric ($\mu_1 = \mu_3 = 1$) differs from an isotropic dielectric only in that $\epsilon \to \epsilon_1$. In this case, in general ϵ_3 does not appear in the final expression. The formula for the isotropic case coincides with the well known expression obtained by Frank[1] (cf. also reference 4). It should be noted that the results which have been obtained apply for Cerenkov radiation of a small closed current loop. In this case by μ_0 we are to understand the magnetic moment associated with the current loop.

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RELATION BETWEEN THE GRAVITATIONAL CONSTANT, THE CHARGE TO MASS RATIO OF THE ELECTRON, AND THE FINE STRUCTURE CONSTANT

I. G. IVANTER

Institute of Scientific Information, Academy of Sciences, U.S.S.R.

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THE following numerical relation exists between the gravitational constant $G = 6.673 \times 10^{-8}\ g^{-1}\ cm^3\ sec^{-2}$, the electron mass m, the electron charge e, and the fine structure constant $\alpha = e^2/\hbar c = (137.0377 \pm 0.0016)^{-1}$

$$\frac{1}{G}\left(\frac{e}{m}\right)^2 = \left(\frac{4\pi}{3}\right)^{\hbar c/2e^2}.$$

This relation is extremely sensitive to the value of the fine structure constant; nevertheless, the numerical relation holds to an accuracy of 1%.

It may be assumed that this simple relation is no accident.

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SATURATION IN A HYPERON SYSTEM

V. A. FILIMONOV

Institute for Nuclear Physics, Electronics, and Automation, Tomsk Polytechnic Institute

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THE phenomenon of saturation is a characteristic property of a system of nucleons. At the present time it is believed that saturation is due to certain attributes of two-body nucleon forces — namely the repulsion at short distances and the exchange character of some of the forces. The main features of contemporary phenomenological nucleon-nucleon potential are deduced from meson theory. Thus repulsion at short distances is related to the existence of the function $\delta(\mathbf{r})$ in the second-order interaction potential of pseudoscalar meson theory. The energy of a system of nucleons depends strongly on the radius of the repulsive core and on the admixture of exchange forces. A decrease in the radius of the repulsive core and in the amount of exchange forces leads to a considerable increase in the binding energy of a system of nucleons.[1]

According to present-day ideas about hyperons