at frequencies ν_{11}, ν_{12}, and ν_0 are completely eliminated it is possible to obtain $\eta >> 1$.

It is best to receive pulses of coherent gravitational waves with the aid of analogous quantum systems in the following manner: We first excite an SES which decays after a time $T_2^* << T_2$ as a result of inhomogeneities of the local fields [4]. By the same token we obtain a system in which are stored energy and information on the phase and on the wave vectors of the exciting pulse, making directional reception possible. At an instant of time $T_2^* < t < T_2$ this system is subject to pulses of gravitational and laser beams, in which the directions of the wave vectors and the frequencies are such that an SES is produced in the system. After a time 2t the system begins to generate, in the required direction, coherent electromagnetic waves whose intensity is given by Eq. (3) of [1]. In such a method of reception, the gravitational pulse serves as the mean that permits, at the required instant of time and in the required direction, the release of the energy stored in the receiver. As shown in [2,5], in regular lattices containing excited nuclei SES and NES can spontaneously occur for γ quanta, and consequently SGS can occur at the frequency of the γ quanta relative to the nucleonic mass quadrupoles. The nuclei in a specially selected lattice can be polarized in such a way that SGS are produced in the $\vec{n}_0$ direction and there are no directions for which SES can occur. In superdense matter, where $\lambda^2 L^{-2} N > 1$(λ - wavelength of γ quanta) the lattice can be arbitrary. when the number of excited nuclei is approximately 10^{10} and $\nu_0 = 10^{18}$ sec^{-1} it is possible to obtain from the receiver one count in 10^3 sec.

It is stated in [6] that owing to the difference in the angular distributions of the radiation intensities of the mass and electric quadrupoles it is impossible to excite high-frequency radiation by means of an alternating electric field. This statement is incorrect: first, directions exist along which both the mass and the electric quadrupole radiate; second, in [1] we considered excitation of a mass quadrupole by means of an electric dipole transition, making it possible to let the mass quadrupole to emit at maximum intensity.

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WAVE FUNCTIONS OF BARYONS AND FUNDAMENTALS OF QUARK DYNAMICS

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In the quark model, the baryons are classified according to their orbital angular momenta L. It is accepted as an empirical fact that the baryon parity is $P = (-1)^L$ [1]. We show in this article that the parity of a three-particle system (without internal parity) is $P = (-1)^k$, where k is the projection of L on the running perpendicular to the particle plane, and that there are no kinematic grounds for $P = (-1)^L$. There is, however, a dynamic justification that rotation around the axis of the maximum moment of intertia; in quantum theory this corresponds to $|k| = L$. Baryons with $|k| \neq L$ are possible, but not very probable.

We give in the article the general form of the wave functions when the spatial part is separated, and an example when this is not done.

1. The description of three perticles relative to the mass center is given by the wave function $\Psi(A,B,C)$, where the vectors are $\vec{A} + \vec{B} + \vec{C} = 0$. If $\Psi(A,B,C) = \pm\Psi(-A,-B,-C)$, then the parity is $P = \pm 1$. On the other hand, Ψ can be regarded as a function of the three distances between the particles and the three Euler angles α, β, and γ defining the orientation of the triangle ABC.

Let us expand Ψ in generalized spherical functions with different k

$$e^{im\alpha} d_{mk}(\beta) e^{ik\gamma}. \quad (1)$$

The running ζ axis is perpendicular to the triangle; z is its initial position, α the rotation about z, γ the rotation about ζ, and m and k are the projections of L on z and ζ. The triangle -A,-B,-C is rotated in its plane through an angle $\gamma = \pi$ relative to the triangle ABC.

Table 1

	$S = 1/2$		$S = 3/2$
Δ Ω	$a, b, c = p, n$ $a, b, c = \lambda$		$\{abc\}$
N	$[{}^{pn}a]$ $\quad a = p, n$	$\{{}^{n}p^{a} - {}^{p}n^{a}\}$	
Ξ	$[{}^{a}\lambda^{\lambda}]$ $\quad a = p, n$	$\{{}^{a}\lambda^{\lambda} - a^{\lambda\lambda}\}$	$\{{}^{a}\lambda\lambda\}$
Σ	$[a^{b\lambda} + b^{a\lambda}]$ $a, b = p, n$	$\{2^{ab}\lambda - {}^{a}b^{\lambda} - {}^{b}a^{\lambda}\}$	$\{{}^{ab}\lambda\}$
Λ	$[p^{n\lambda} - n^{p\lambda} + 2^{np}\lambda]$	$\{p^{n\lambda} - n^{p\lambda}\}$	$[{}^{pn}\lambda]$
abbreviation	[1/2]	{1/2}	{3/2},[3/2]

In this rotation (1) is multiplied by $(-1)^k$.

Therefore the parity is

$$P = (-1)^k. \quad (2)$$

2. Notation. In place of $\Psi(A,B,C)$ we write ABC.

The number of the particle is denoted by the place in the formula. Particle 1 is at A, 2 at B, and 3 at C.

Total symmetrization in the particle numbers:{ }; total antisymmetrization: [ ]. For example, [ABC] = ABC - BAC + ...

a, b, c - quark states, i.e., they run through p, n, λ. The summary spin is S; its 'parallelism' to L is denoted S||L, 'antiparallelism' is denoted -S||L. ↑, ↓ - quark spin. (The case J = L ± 1/2, S = 3/2 has not yet been observed.)

3. Wave functions. ↑↓ + ↓↑ has spin 1. ↑↓ - ↓↑ has spin 0; we write in accordance with this rule for the quark and spin functions with specified isospin and spin, for example for Λ 1/2, when S coincides with the spin of the third particle:

$$(pn\lambda - np\lambda)(\uparrow\downarrow\uparrow - \downarrow\uparrow\uparrow) = {}^{p}{}_{n}{}^{\lambda} - {}^{n}{}_{p}{}^{\lambda} - {}_{p}{}^{n\lambda} + {}_{n}{}^{p\lambda}. \qquad (3)$$

Raised letters - spin ↑, lowered - spin ↓. We proceed similarly when S coincides with the spin of the second or first particle.

An expression on the right is symmetrized or antisymmetrized. We thus obtain all the types of spin-quark functions (Table 1).

Table 2

			L	J^P (MeV)
Δ	{3/2}	S‖L	0,2,4,6,8	3/2+, 7/2+,11/2+,15/2+,19/2+
	{3/2}	-S‖L	1	1/2−
Ω	{3/2}	S‖L	0	3/2+
Λ	{1/2}	S‖L	0,1,2,3,4,	1/2+,3/2−,5/2+,7/2−, 9/2
	[3/2]	-S‖L	1,2	1/2− 1405, 1/2− 1670
	[1/2]	S‖L	1	3,2− 1700
Σ	{3/2}	S‖L	0,1,2,3	3/2+,5/2−,7/2+, 9/2
	{1/2}	S‖L	0,2	1,2+, 5/2+
	{1/2]	S‖L	1	3/2 1660
Ξ	{1/2}	S‖L	0,2	1/2+, 5/2 1933
	{3/2}	S‖L	0	3,2+
	[1/2]	S‖L	1	3/2 1815
N	{1/2}	S‖L	0,2	1/2+, 5/2+
	{1/2}	-S‖L	1	1/2+ 1400
	[1/2]	S‖L	1,3,5,7	3/2−,7/2−, 11/2−, 15/2−
	[1/2]	-S‖L	1	1/2− 1570
	*	-S‖L	1 or 2	1/2− 1700
			1	5/2−

[ ], * ?

These functions are multiplied by ABC or [ABC] so as to obtain an antisymmetrical function with arbitrary L, m, k.

Concretely, the wave functions can be (see Table 2): * - mixed antisymmetrization of spatial and quark function: [ABC - ABC] S = 3/2 ← → isospin projections.

We obtain here a smooth dependence of the masses on L. Under the hypothesis of the states [1/2], [3/2], * all the excitations are rotational. The absence of L = 0 for them is strange. The parity is $P = (-1)^L$ with two doubtful exceptions. It is probable that $|k| = L$. Classically, the rotation energy $E = L^2/2I$ is minimal when the moment of inertia I is maximal. Rotation around the axis with small I is unstable under perturbations. For the triangle, the maximum I is about the ζ axis perpendicular to the plane. Only rotation around ζ is stable. From the quantum point of view this means $|k| = L$. As is well known, the average energy of quantized rotation is

$$\langle H \rangle = (q+2)/4\,[L(L+1) - k^2] + s k^2/2 \qquad (4)$$

q, r, and s are inversely proportional to the moments of inertia. s is about the ζ axis. The energy is minimal when $|k| = L$. Classically, the quarks rotate in one plane. The z axis is parallel to ζ.

[1] Ya.I.Azimov, V.V.Anisovich, A.A.Ansel'm et al. JETP Letters 2, 109, 1965, transl. p. 68.

E R R A T A

Article by M. P. Leontovskii, Vol 5, No 12, p. 362.

On p. 450, 6-th line from the bottom, read: These functions are multiplied by (ABC) or [ABC].

Line 3 from the botton, read: $[\overleftarrow{A}\overrightarrow{B}\overleftarrow{C} - \overrightarrow{A}\overleftarrow{B}\overleftarrow{C}]$.

p. 365, formula (4): Replace (q + 2) by (q + r).