multiplets, and the equality of the magnetic moments of the proton and of the $\omega \rightarrow \pi + \gamma$ transition [7]. From the point of view of such a model, the particle classification presented above is perfectly probable, whereas the predicted mass values are, of course, estimates. The main feature of the scheme described is that it includes almost all presently known resonances.

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ROTATION OF SUPERDENSE CONFIGURATIONS

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Statistical superdense configurations with average density $\rho_{av} > 10^{12}$ g/cm^3 have a limiting mass $M = 1.55M_{\odot}$ at a radius R = 8.92 km [1]. It is of interest to consider the influence of rotation on the parameters of such stars.

As is well known, in ordinary stars the centrifugal force can balance the gravitational force, for if the momentum is conserved the centrifugal force increases like $1/r^3$, while the gravitational force is proportional to $1/r^2$. At very large rotational velocities ($v \sim c$), however, the centrifugal force increases already like $1/r$, against $1/r^2$ for gravitation. This example illustrates the extent to which the situation changes at large rotational velocities (general-relativity effects will be discussed below); it follows therefore that rotation has little influence on the parameters of neutron stars.

Calculation of a rotating configuration on the basis of Newton's theory is rather cumbersome, and in Einstein's theory the difficulties increase by many times. We therefore estimate the configuration parameters for the following simplified model: We assume the star rotation to be such that the deviation from sphericity of the hyperon core, which has 0.93 - 0.97 of the mass of the entire configuration, can be neglected. The angular momentum of the star $\mathcal{M}$ should then be smaller than MR_gc (R_g is the gravitational radius of the configuration), which is of the order of the solar momentum. Under this assumption the shell of the hyperon star rotates in fact in an external gravitational field produced by a spherically-symmetrical rotating core.

The use of such a model is justified by the fact that estimates show that rotation with momentum $\mathcal{M} \sim MR_gc$ has negligible effect on the core of the configuration (the increase in mass, with account of the Lorentz correction, is of the order of 2%). This model is a relativistic generalization of Roche's known model in Newton's theory.

The external gravitational field of a large spherically-symmetrical mass M with momentum $\mathcal{M} < MR_gc$ was considered in [3], and is of the form

$$\begin{gathered} -g_{00} = g^{11} = (1 - R_g/r), \quad g_{22} = r^2, \quad g_{33} = r^2\sin^2\theta, \\ g_{03} = a\sin^2\theta/r, \quad a = 2G\mathcal{M}/c^3 \end{gathered} \tag{1}$$

To describe the motion of the shall, we use the Euler relativistic equation [4], which yields with the aid of (1)

$$\begin{gathered} \frac{w}{\beta^2}\left[-\frac{1}{2}\,\frac{R_g/r^2}{(1 - R_g/r)} - \frac{a\sin^2\theta\cdot\dot{\varphi}}{r^2(1 - R_g/r)^{3/2}c} + \frac{\dot{\varphi}^2 r\sin^2\theta}{c^2}\right] = \frac{\partial P}{\partial r} \\ \frac{w}{\beta^2}\left[\frac{2a\sin\theta\cos\theta\,.\dot{\varphi}}{r(1 - R_g/r)^{1/2}} + \frac{r^2\dot{\varphi}^2\sin\theta\cos\theta}{c}\right] = \frac{\partial P}{\partial\theta} \\ \beta^2 = 1 - g_{33}\dot{\varphi}^2/c^2 \end{gathered} \tag{2}$$

Here $w = P + \epsilon$ is the heat function per unit volume, and $\dot{\varphi}$ is the angular velocity measured in proper synchronized time.

From the first equation of the system (2) we see that the rotation of the configuration core leads to the appearance of a new force which partially offsets the centrifugal force. We note that the additional force, dependent on $\dot{\varphi}^2$ like the centrifugal force, will lead to an increase in the deformation of the configuration if the core and the shell rotate in opposite directions.

To obtain a solution of the system (2) we use the relativistic chemical potential

$$\frac{d\mu}{\mu} = \frac{dP}{\epsilon + P} \tag{3}$$

Then, assuming that $\beta^{-2} \approx 1 + g_{33}\dot{\varphi}^2/c^2$ and rigid-body rotation, $\dot{\varphi} \approx \omega(1 - R_g/r)^{-1/2}$, the solution of (2) takes the form

$$\begin{gathered} \ln\frac{\mu(r)}{\mu(R)} = \frac{\omega^2}{c^2}\left[\frac{r^2}{1 - R_g/r} - \frac{R^2}{1 - R_g/R}\right]\frac{\sin^2\theta}{2} + \\ + \ln\left[\frac{1 - R_g/R}{1 - R_g/r}\right]^{1/2} + \frac{\omega\, a\sin^2\theta}{c}\left[\frac{1}{r - R_g} - \frac{1}{R - R_g}\right] \end{gathered} \tag{4}$$

Here R is the radius of the configuration core and r is the coordinate of the shell. For a specified equation of state, Eq. (4) yields μ as a function of **r** and θ.

To determine the external shape of the star it is necessary to put $P = 0$ in (4) [see (3)].

In view of the fact that the thickness of the neutron-configuration shell is one order of magnitude smaller than the dimensions of the nucleus, we introduce for an estimate of the shell deformation the quantity

$$\frac{\Delta}{R} = \frac{\tilde{r} - R}{R} \qquad (5)$$

where $\tilde{r}$ is the coordinate of the surface, and the quantity $(\Delta/R)^2$ can be neglected.

In determining Δ/R from (4) we choose the value of $\ln[\mu(\tilde{r})/\mu(R)]$ such that in the absence of rotation the thickness of the shell coincides with the published calculations for statistical configurations [1].

In a superdense configuration with central density $\rho(0) \to \infty$, mass $M = 1.1M_{\odot}$, and angular momentum of the order of that of the sun, $\mathcal{M} \sim \mathcal{M}_{\odot}$, we obtain for Δ/R the values 0.127 and 0.176 on the pole and on the equator, respectively. If the configuration core were not rotating, then Δ/R on the equator would be 0.254.

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SEARCH FOR COSMIC-RAY CHARGED PARTICLES HAVING MASS $\geq 50m_e$ AND DECAYING IN MILLISECOND TIME INTERVALS

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Kenffel et al [1] investigated the existence of charged particles with lifetime 10^{-7} - 10^{-1} sec. In particular, Fazio and Ritson searched in cosmic rays for long-lived charged particles with mass $> 60m_e$ and with lifetimes in millisecond time intervals (10^{-4} - 10^{-1} sec). According to them, if such particles do exist their intensity should not be more than 0.05% that of muons.

Their result, however, is not quite unambiguous, since their apparatus did not make it possible to eliminate from the observed cases the decay-stimulating random coincidences, the calculated number of which was equal to the observed effect.

To check on the existence of unstable cosmic-ray charged particles with lifetimes in the millisecond interval, we have constructed the experimental set-up two projections of which are shown in Fig. 1. Figure 2 shows a block diagram of the electronic control system.