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GYROMAGNETIC RATIOS AND MODIFIED SCHMIDT FORMULA

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We have systematically examined the experimental magnetic dipole moments (gyromagnetic ratios) of the ground and excited states of even- and odd-A nuclei in the mass region of A = = 2-243. The properties and regularities observed for the even-even nuclei have been discussed earlier /1/.

The gyromagnetic ratio of the nucleon with spin I and orbital momentum ℓ was expressed by Schmidt /2,3/ as

$$g^{Sch}_{p(n)} = g^{\ell}_{p(n)} \pm \frac{g^{s}_{p(n)} - g^{\ell}_{p(n)}}{2\ell + 1}, \tag{1}$$

where $g^{\ell}_{p(n)}$ and $g^{s}_{p(n)}$ are the orbital ($g^{\ell}_{p} = 1$, $g^{\ell}_{n} = 0$) and spin gyromagnetic ratios of the proton (neutron), respectively. In the Schmidt formula, the values of the spin g-factors are equal to those of free proton and neutron, $g^{s}_{p} = 5.58569$ and $g^{s}_{n} = -3.82630$. Substituting numeral values into eq. (1), one obtains

$$\begin{aligned} g^{Sch}_{p} &= \frac{\text{const}}{I + \delta_p} + 1, & \delta_p &= \begin{cases} 1 \text{ for } I = \ell - 1/2 \\ 0 \text{ for } I = \ell + 1/2, \end{cases} \\ g^{Sch}_{n} &= \frac{\text{const}}{I + \delta_n}, & \delta_n &= \begin{cases} 1 \text{ for } I = \ell - 1/2 \\ 0 \text{ for } I = \ell + 1/2. \end{cases} \end{aligned} \tag{2}$$

Using the successful features of eqs. (1) and (2), Schmidt made an attempt to make the shell model capable of predicting the magnetic moments (g-factors) of the nuclei. This model was based on the following statements: (i) The nucleon moments in the even-even nuclei are almost completely compensated and the resulting moment of a nucleus is negligible. (ii) As follows from the first statement, the moment of an odd nucleus has to be close to that of the last odd nucleon.

The comparison with the experiment has shown that the Schmidt formula describes only some nuclei with nucleon numbers near to the closed shells. For another nuclei, the discrepancy between the experimental g-factors and those of Schmidt may arise due to several reasons. If the $g^{s}_{p(n)}$ -factor conserves its value in a bound nucleus, as follows from eq. (1), and the g-factor of the core is negligible, the half-sum of the g-fac-

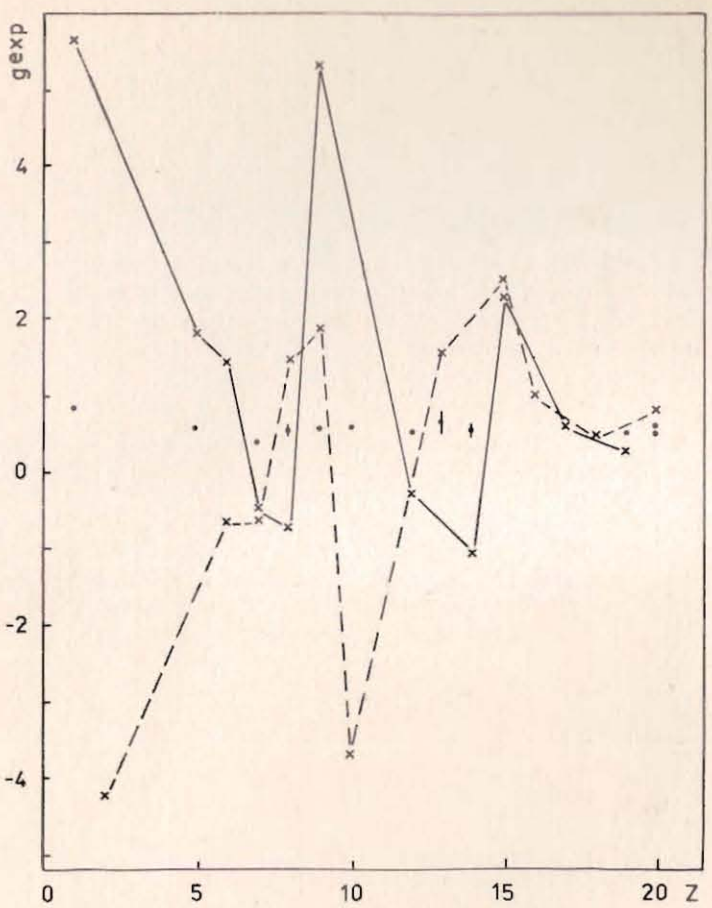

Fig.1. Gyromagnetic ratios of mirror nuclei (crosses) and their even-even and odd-odd cores (full circles) versus the atomic number. The solid and dotted lines represent the nuclei with Z, N + 1 *and* Z + 1, N, *respectively.*

tors of mirror nuclei would be equal to $(g_p^{Sch}+g_n^{Sch})/2$. Indeed, if $g_1^{exp}=g(Z,N+1)$, $g_2^{exp}=g(Z+1,N)$ and $g_0^{exp}(Z,N)$ are the g-factors of the mirror nuclei and of the core, respectively, the half-sum of the g-factors of the mirror nuclei can be written as

$$\frac{g_1^{exp}+g_2^{exp}}{2}=\frac{(g_0^{exp}+g_n^{Sch})+(g_0^{exp}+g_p^{Sch})}{2}=$$

$$=g_0^{exp}+\frac{g_n^{Sch}+g_p^{Sch}}{2}\simeq\frac{g_n^{Sch}+g_p^{Sch}}{2}.$$

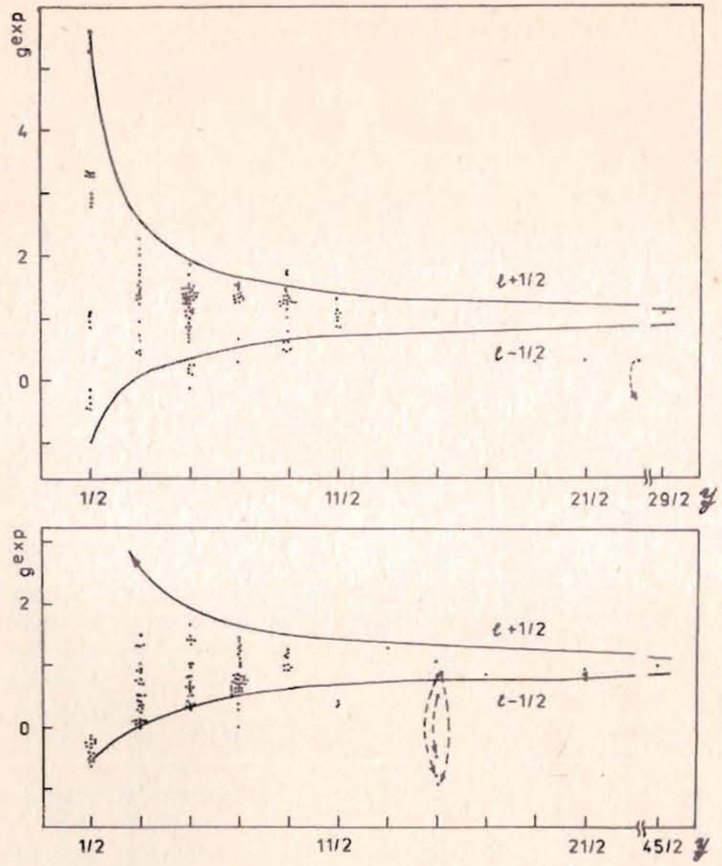

Fig.2. Experimental gyromagnetic ratios of odd-even nuclei versus spin of the level. The circles on the upper and lower parts of the figure represent the g-factors with $J=\ell+1/2$ *and* $J=\ell-1/2$, *respectively. The dotted lines show the* g*-factors uncertain in sign and/or in magnitude. The solid lines, denoted by* $\ell+1/2$ *and* $\ell-1/2$, *represent the Schmidt lines.*

The experimental values of $g(Z,N+1)$, $g(Z+1,N)$ and $g_0^{exp}(Z,N)$ and their dependence on Z are shown in table 1 and fig.1. All experimental values of the g-factors with uncertainties quoted in original works and spins J of the levels were taken from refs. /4,5/. It is seen from table 1 and fig.1 that the values of $g_0^{exp}(Z,N)$ differ significantly from zero and the values of $(g_1^{exp}+g_2^{exp})/2$ are close to those of g_0^{exp} for any spin J. Hence the spin gyromagnetic ratio $g_{p(n)}^{s}$ in eq.(1) has to be replaced by the effective gyromagnetic ratio $g_{p(n)}^{s,eff}$ which changes from nucleus to nucleus.

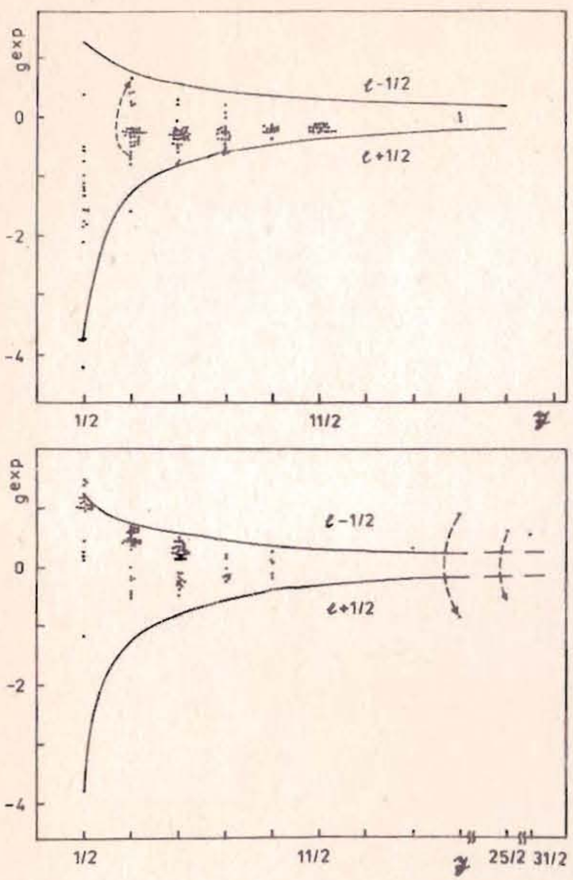

Fig.3. Experimental gyromagnetic ratios of even-odd nuclei versus spin of the level. Everything is denoted by the same way as in fig.2.

The systematics of the experimental gyromagnetic ratios of even-even nuclei /1/ shows that there is no full compensation of the nucleon moments. Thus the g-factors of even-even nuclei cannot be neglected.

If according to Schmidt the g-factor of the odd-A nucleus is equal to that of a nucleon in the outermost subshell, all values of the experimental gyromagnetic ratios g^{exp} of these nuclei would lie on the Schmidt lines. However, as is seen from figs.2 and 3, even the g-factors of the states with $J = \ell + 1/2$ or $J = \ell - 1/2$ are spread between the Schmidt lines. This may be explained by assuming that all particles contribute to the nuclear gyromagnetic ratio. It should be noted that the dependence of the experimental gyromagnetic ratios of the odd-odd nuclei on the mass number (see fig.4) is similar.

The experimental gyromagnetic ratios of the odd-even and even-odd nuclei are distributed irregularly along the ordinate g (see figs.5 and 6) forming several groups placed at 0.6-1.0 units from each other. This may indicate that for the bound nucleons the values of $g^{\ell}_{p(n)}$ have also to be replaced by the effective orbital gyromagnetic ratios $g^{\ell,\mathrm{eff}}_{p(n)}$, which take the values $g^{\ell,\mathrm{eff}}_{p} = 1, 0$ and $g^{\ell,\mathrm{eff}}_{n} = 0,-1$. Recently, Becker et al. /6/ have modified the Schmidt formula to describe the experimental gyromagnetic ratio of ^{206}Hg. They introduced δg^{ℓ} and δg^{s} in addition to the g-factors of the free nucleon, g^{ℓ} and g^{s}, and a tensor term. Important contributions, but not all, to δg^{s} and to the tensor term are explained by core polarization.

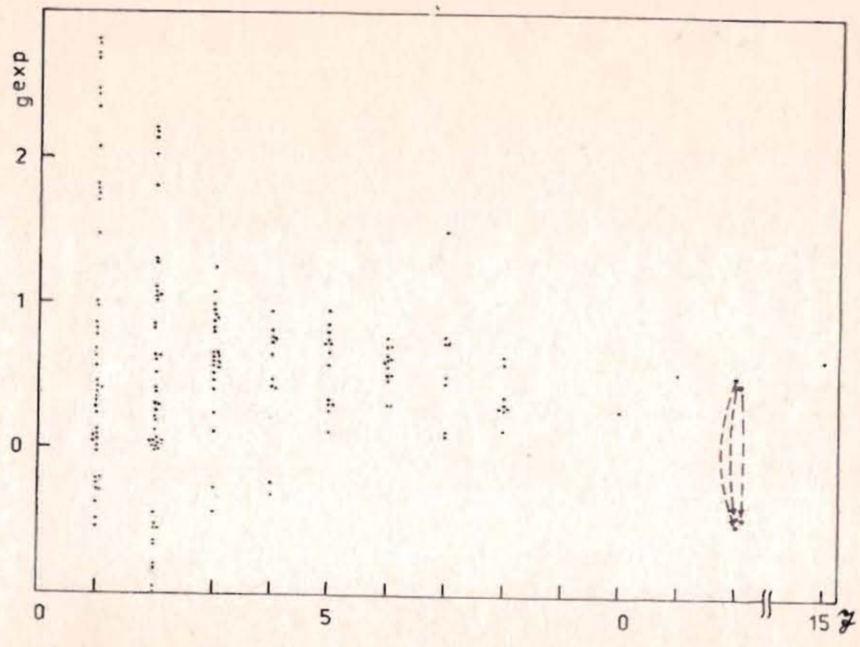

Fig.4. Experimental gyromagnetic ratios of odd-odd nuclei versus spin of the level. The dotted lines show the g-factors uncertain in sign.

The modification of the Schmidt formula can be made on the basis of the facts discussed above and in ref. /1/ and using the effective gyromagnetic ratios of ref. /1/ (eqs.8a and 8c*) taken in the generalized form:

$$g^{\mathrm{eff}}_{p(n)} = \frac{[\sum\limits_{i} g^{(i)}_{p(n)} \, k^{(i)}_{p(n)} \pm \sum\limits_{j} g^{(j)}_{p(n)} \, k^{(j)}_{p(n)}]_{\pi^+}}{A} \pm$$

$$\pm \frac{[\sum\limits_{i} g^{(i)}_{p(n)} \, k^{(i)}_{p(n)} \pm \sum\limits_{j} g^{(j)}_{p(n)} \, k^{(j)}_{p(n)}]_{\pi^-}}{A}, \tag{3}$$

$$g^{\mathrm{eff}}_{av} = \frac{\sum\limits_{i,j} g^{(i,j)}_{p} \, k^{(i,j)}_{p} + \sum\limits_{i,j} g^{(i,j)}_{n} \, k^{(i,j)}_{n}}{A}.$$

Here $g^{\mathrm{eff}}_{p(n)}$ is the g-factor of all protons (neutrons) averaged per one nucleon, $g^{(i)}_{p(n)}$ and $g^{(j)}_{p(n)}$ are the g-factors of the protons (neutrons) on the subshells with $I^{(i)}_{p(n)} = \ell + 1/2$ and $I^{(j)}_{p(n)} = \ell - 1/2$, respectively, determined by using the Schmidt formula, $k^{(i)}_{p(n)}$ and $k^{(j)}_{p(n)}$ are the numbers of the protons (neutrons)

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*Eqs.8a and 8c of ref. /1/ have to be corrected by adding the dots signifying subsequent terms.

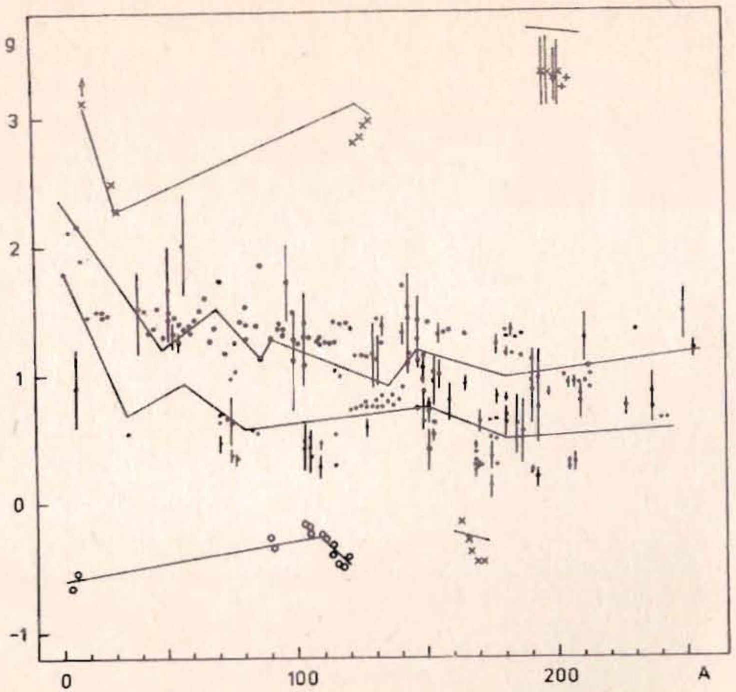

Fig.5. Experimental gyromagnetic ratios of odd-even nuclei versus the mass number. The circles, crosses and full circles denote the g-factors with $J \neq 1/2$, $J = 1/2^+$ and $J = 1/2^-$, respectively. The solid lines represent the least-squares fit to the calculated g values.

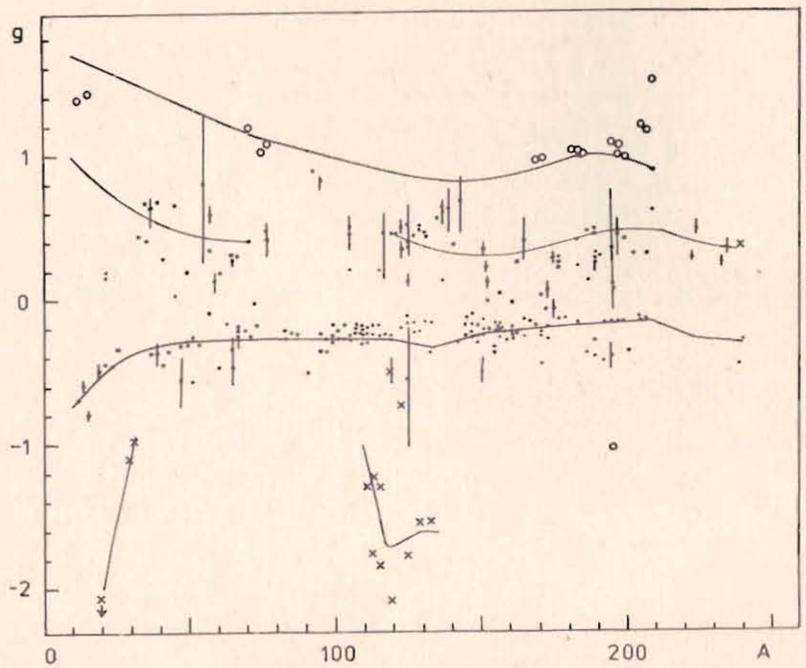

Fig.6. Experimental gyromagnetic ratios of even-odd nuclei versus the mass number. Everything is denoted by the same way as in fig.5.

on the subshells (the subshell order is taken according to ref./3/), g_{av}^{eff} ($\equiv g_d^{eff}$ in ref./1/) is the nuclear g-factor averaged per one nucleon and $\pi^{\pm}$ is parity of the subshell.

Thus, the gyromagnetic ratios of the levels in odd nuclei, of the isomers in the even-even nuclei and of the levels in magic and near-magic even-even nuclei can be calculated using the expression

$$g_1^{calc} = \frac{1}{2}\left[\left(g_p^{eff}\frac{J+I_p^{last}}{I_p^{last}+\delta_p} + g_p^{\ell,eff}\right) + \left(g_n^{eff}\frac{J+I_n^{last}}{I_n^{last}+\delta_n} + g_n^{\ell,eff}\right) + g_{av}^{eff}\right], \quad (4)$$

where $I_{p(n)}^{last}$ is spin of the last nucleon (or of the last proton (neutron) pair in the even-even nucleus).

The levels in the even-even and odd-odd nuclei with $Z = N$ have the g-factor (see table 2)

$$g_2^{calc} = g_{av}^{eff}\,. \quad (5)$$

For the non-isomeric levels in non-magic even-even nuclei and for near-magic odd-odd nuclei with $Z \neq N$, we have

$$g_3^{calc} = \frac{1}{2}\left(\frac{g_p^{eff} + g_n^{eff}}{2} + g_{av}^{eff}\right) = 0{,}75\, g_{av}^{eff}\,. \quad (6)$$

Finally, the g-factors of the levels in the odd-odd nuclei, except those mentioned above, can be written as

$$g_4^{calc} = \frac{1}{2}\left[(g_p^{eff} + g_n^{eff})\frac{J + I_p^{last} + I_n^{last}}{I_p^{last} + \delta_p + I_n^{last} + \delta_n} + g_p^{\ell,eff} + g_n^{\ell,eff} + g_{av}^{eff}\right]. \quad (7)$$

All expressions for g^{calc} can be united by using several additional Kronecker symbols.

The g-factors of more than 800 levels with known values of g^{exp} were calculated to check the expressions proposed in the present work.

Table 1

Gyromagnetic ratios of mirror nuclei and of their cores

Z	N	A	J^π	$(g_1,g_2)^{exp}$	$(g_1+g_2)^{exp}/2$	$g_0^{exp}(Z,N)$
1	2	3	$1/2^+$	+5.597	+0.67(20)	
2	1	3	$1/2^+$	-4.25(40)		
1	1	2	1^+			+0.857
5	6	11	$3/2^-$	+1.786	+0.550	
6	5	11	$3/2^-$	-0.686		
5	5	10	3^+			+0.598
6	7	13	$1/2^-$	+1.404	+0.380	
7	6	13	$1/2^-$	-0.644		
7	7	14	1^+			+0.404
7	8	15	$1/2^-$	-0.566	+0.435	
8	7	15	$1/2^-$	+1.438		
7	7	14	1^+			+0.404
8	8	16	3^-			+0.55(3)
8	9	17	$5/2^+$	-0.758	+0.566	
9	8	17	$5/2^+$	+1.889		
8	8	16	3^-			+0.55(3)
9	9	18	5^+			+0.572
9	10	19	$1/2^+$	+5.248	+0.738	
10	9	19	$1/2^+$	-3.772		
9	9	18	5^+			+0.572
10	10	20	2^+			+0.54(4)
12	13	25	$5/2^+$	-0.342	+0.559	
13	12	25	$5/2^+$	+1.461		
12	12	24	2^+			+0.51(2)
13	13	26	3^+			+0.65(15)
14	15	29	$1/2^+$	-1.11	+0.680	
15	14	29	$1/2^+$	+2.470		
14	14	28	2^+			+0.55(10)
15	16	31	$1/2^+$	+2.263	+1.619 or +0.644	
16	15	31	$1/2^+$	0.976		
17	18	35	$3/2^+$	+0.548	+0.484	
18	17	35	$3/2^+$	+0.421		
19	20	39	$3/2^+$	+0.261	+0.470	
20	19	39	$3/2^+$	(+)0.679		
19	19	38	3^+			+0.458
20	20	40	3^-			+0.51(16)
20	20	40	5^-			+0.58(10)

Table 2

Gyromagnetic ratios of the nuclei with Z = N.

Z	A	E_{lev} (MeV)		g^{exp}	g_2^{calc}	g^{exp}/g_2^{calc}
8	I6	6.I3	3^-	+0.55(3)	0.63	0.87(5)
I0	20	I.630	2^+	+0.54(4)	0.62	0.87(6)
I2	24	I.368	2^+	+0.5I(2)	0.6I	0.84(3)
I4	28	I.799	2^+	+0.55(I0)	0.58	0.95(I7)
20	40	3.730	3^-	+0.5I(I6)	0.60	0.85(27)
20	40	4.492	5^-	+0.58(I0)	0.60	0.97(I7)
22	44	I.083	2^+	+0.35(2)	0.59	0.59(3)
I	2	0	I^+	+0.857438	0.88	0.97
3	6	0	I^+	+0.8220	0.80	I.03
5	I0	0	3^+	+0.598	0.73	0.82
5	I0	0.7I7	I^+	+0.63(I2)	0.73	0.86(I6)
7	I4	0	I^+	+0.40376	0.66	0.6I
7	I4	5.I06	2^-	0.66(4)	0.66	I.00(6)
7	I4	5.83	3^-	0.65(I7)	0.66	0.98(26)
9	I8	I.I20	5^+	+0.572(6)	0.62	0.92(1)
II	22	0	3^+	+0.582(I)	0.6I	0.95
II	22	0.583	I^+	+0.555(I7)	0.6I	0.9I(3)
II	22	2.2I0	I^-	0.27(4)	0.61	0.44(7)
I3	26	0.4I7	3^+	+0.65(I5)	0.61	I.07(2)
I9	38	0	3^+	+0.4578(3)	0.60	0.76

In employing expressions (4,6,7), one has to take into account some irregularities. (i) Instead of the external $s_{1/2}$ and $p_{1/2}$ subshells, the next ones are filled, as a rule, by nucleons or by pairs of the nucleons in even-even nuclei (see footnotes in the tables given below), therefore the values of $g^{eff}_{p(n)}$, g^{eff}_{av} and spin factors are changed. (ii) A considerable part of the calculated g-factors agrees with the experimental values on condition that $g_p^{\ell,\mathrm{eff}} = 0$. It means that the proton behaves in the same way as the neutron under certain conditions which appears to possess the orbital momentum and consequently the gyromagnetic ratio of $g_n^{\ell,\mathrm{eff}} = -1$. (iii) In many cases, if $g_p^{\ell,\mathrm{eff}} = 0$ and $g_n^{\ell,\mathrm{eff}} = -1$ in eqs. (4) and (7), the agreement with the experiment is only possible if the condition $g^{eff}_{av} = 0$ holds.

The sign in eq. (3) and one of the values of $g^{l,eff}_{p(n)}$ and g^{eff}_{av} are chosen depending mainly on the degree of subshell filling, on the number of particles (holes) over the filled subshells and on the isomerism, spin and parity of the levels.

It turns out that such a choice leads to the fact that the nuclei are divided into several groups which are listed in table 3. For the odd-even nuclei such division is broken again into subdivision of nuclei with $g^{s_{1/2}} = g^{free} \frac{Z}{A} + g^{free} \frac{N}{A} \approx 0$, i.e. $N/Z \approx 1.46$. For example (see table 4), it appears in the nuclei with $Z = 73,75,77$ ($N \approx 108$) that the part of the experimental g-factors is close to the values for non-magic nuclei, while the g-factors of other levels in the same nuclei are strongly different in magnitude and are consistent with g^{exp} of semi-magic nuclei. About ten odd-N isotopes from gadolinium to osmium and a number of the $11/2^-$ levels of various nuclei fall into the region of $g^{s_{1/2}} \approx 0$ ($N/Z \approx 1.46$). For this group of the gyromagnetic ratios ($g^{exp}/g^{calc} > 2$), as in the previous case, the agreement with the experiment cannot be achieved without additional assumptions (see table 5). For instance, the g-factors of the $11/2^-$ levels agree with g^{exp} if we assume that these levels have pure one-neutron character and in eq. (4) leave only the $g^{eff}_n \cdot f(J, I^{last}_n)$ term. The even-even and odd-odd nuclei are divided into groups without exceptions (see table 3).

Thus, the g-factors of the $J^{\pi} = 2^+$ levels are the same for spherical even-even nuclei as well as for deformed ones. In the even nuclei with magic and non-magic numbers of Z and N (see figs. 7 and 8), the values of g^{exp} differ appreciably. The comparison between the calculated and experimental gyromagnetic ratios shows that the filling of higher shells instead of $s_{1/2}$ and $p_{1/2}$ has to be accounted.

The calculated and experimental gyromagnetic ratios are compared in tables 2,4-7. Column "sign" in these tables indicates what sign has to be taken in eq. (3). If the error of the g^{exp} and g^{exp}/g^{calc} values is not quoted, it is in one of the following digits. It may be seen from tables 2,4-7 that for about 75% of all levels considered, the calculated g-factors agree with the experimental ones within 30%. It seems to us that the proposed empirical expressions may be used for the prediction of the nuclear gyromagnetic ratios.

Groups of the nuclei with different signs of $g^{eff}_{p(n)}$ *and various values of* $g^{l,eff}_{p(n)}$.

Sing in eq. (3)	$g_p^{l,eff}$	$g_n^{l,eff}$	Group
I	2	3	4
			Odd-even nuclei
-	0	-I	I.The $J^{\pi}=I/2^-$ levels, except of the $Z=Z_{mag}-I$ nuclei with last neutron pair in $s_{I/2}$. 2.The $J^{\pi}=I/2^+$ levels in the Z=69 nuclei. (From all odd-Z nuclei, those with Z=69 only have negative values of g^{exp} for $J^{\pi}=I/2^+$ behaving as they belong to the negative-parity levels.)
+	a)	0	I.The $J^{\pi}=I/2^-$ levels in the $Z=Z_{mag}-I$ nuclei with the last neutron pair out of $s_{I/2}$. In this case $g_n^{eff}=g_n^{free}$. 2.The $J^{\pi}=I/2^+$ levels, except of those in the Z=69 nuclei. In this case $g_p^{eff}=g_p^{free}$. 3.The levels with $J \neq I/2$.
			Even-odd nuclei
+	0	0	I.The $J=l+I/2$ levels: $J^{\pi}>I5/2^-$ in the region of $N>I09$, $g_{av}^{eff}=0$ for $Z=82-2$.
	or		
+	+I	-I	2.The $J=l-I/2$ levels: $J^{\pi}\neq I/2^-$ in the regions of $N<50$ and $N>I08$.
-	0	-I	I.The $J=l+I/2$ levels: $3/2^- \leq J^{\pi} \leq I3/2^+$ in the regions of $N \leq 50$ and $82 \leq N \leq I09$, in this case $g_{av}^{eff}=0$ for $Z,N<20$. $J^{\pi}=I/2^+$ for $Z,N<20$. 2.The $J=l-I/2$ levels in the region of $50<N<I08$.
+	+I	0	The $J^{\pi}=I/2^-$ levels in the nuclei with $N \approx N_{mag}$ b) and the levels with $J^{\pi}>I5/2^+$.
+	a)	0	The $J^{\pi}=I/2^+$ levels in the region of $Z,N>20$. In this case $g_n^{eff}=g_n^{free}$.

Table 3 (continued)

I	2	3	4
			Even-even nuclei
+	0	0	I. Non-isomeric levels in the nuclei with $Z\neq Zmag$ and $N\neq Nmag$.
	or		
+	+I	-I	2. Isomeric levels in the nuclei with $Z=Zmag$. 3. The levels in the nuclei with $N=Nmag$ and $N\not\approx Nmag$ [b], in this case the term with g_n^{eff} is equal to zero.
-	0	-I	I. Isomeric levels in the nuclei with $Z\neq Zmag$ and $N\neq Nmag$. 2. Non-isomeric levels in the $Z=Zmag$ nuclei.
			Odd-odd nuclei
+	0	0	I. The negative-parity levels in the nuclei with $Z\not\approx Zmag$ [b] and $N\not\approx Nmag$ [b].
	or		
+	+I	-I	2. The positive-parity levels in the nuclei with $Z\approx Zmag$ [b] and $N\approx Nmag$ [b]. For $\mathcal{J}^{\pi}=I^{+}$, $g_p^{eff}=g_p^{free}$ in the region of $Z\geqslant 20$ and $g_n^{eff}=g_n^{free}$ in the region of $Z>5I$.
-	0	-I	The negative-parity levels in the non-magic nuclei with $Z<49$ and $N\leqslant 5I$. In this case $g_{av}^{eff}=0$.
+	+I	0	All nuclei, except of mentioned above. In this case, $g_p^{eff}=g_p^{free}$ and $g_n^{eff}=g_n^{free}$ for $\mathcal{J}^{\pi}=I^{\pm}$ and 2^{+}.

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a) The choice of $g_p^{1,eff}$ is not unique.

b) The number of the particles (holes) differs from the magic one by no more than 5% of the total number of nucleons.

Table 4

Gyromagnetic ratios of the odd-even nuclei

Z	A	E_{lev} (MeV)	$\mathcal{J}^{\pi}$	g^{exp}	Sign	$g^{1,eff}$		g_I^{calc}	g^{exp}/g_I^{calc}
						p	n		
I	2	3	4	5	6	7	8	9	IO
3	7	0	$3/2^-$	+2.170973(I)	+	I	0	+2.50[ab])	0.87
5	II	0	$3/2^-$	+1.792425(I)	+	I	0	+I.32	I.36
5	I3	0	$3/2^-$	+2.II852(34)	+	I	0	+I.75	I.2I
7	I3	0	$I/2^-$	-0.6445(7)	+	I	0	-0.58[bc])	I.II
7	I5	0	$I/2^-$	-0.566378	+	I	0	-0.57[bc])	0.99
7	I5	5.276	$5/2^+$	+I.0(3)	+	I	0	+I.56	0.6(2)
9	I7	0	$5/2^+$	+1.8889(5)	+	I	0	+I.55	I.22
9	I9	0	$I/2^+$	+5.25677(I)	+	I	0	+5.25[ad])	I.00
9	I9	0.I97	$5/2^+$	+I.443(3)	+	I	0	+I.3I	I.I0
II	23	0	$3/2^+$	+I.478436(I)	+	I	0	+I.22	I.21
II	25	0	$5/2^+$	+I.473(2)	+	I	0	+I.I2	I.32
I3	25	0	$5/2^+$	+I.4582(5)	+	I	0	+I.49	0.98
I3	27	0	$5/2^+$	+I.456602(I)	+	I	0	+I.33	I.I0
I5	29	0	$I/2^+$	2.4698(6)	+	I	-I	+2.28[ae])	(+)I.08
I5	3I	0	$I/2^+$	+2.26320(6)	+	I	-I	+2.36[aef])	0.96
I7	35	0	$3/2^+$	+0.5479I6	+	I	-I	+0.69	0.79
I9	39	2.8I4	$7/2^-$	I.5(3)	+	I	0	+I.49	(+)I.0I(20)
I9	4I	I.294	$7/2^-$	+I.26(2)	+	I	0	+I.34	0.94(2)
2I	43	0	$7/2^-$	+I.32(I)	+	I	0	+I.37	0.96(I)
2I	45	0	$7/2^-$	+I.358995(I)	+	I	0	+I.20	I.I3
2I	47	0	$7/2^-$	+I.526(6)	+	I	0	+I.23	I.24(I)
23	49	0	$7/2^-$	I.28(I)	+	I	0	+I.30	(+)0.98(I)
23	5I	0	$7/2^-$	+I.47I83(3)	+	I	0	+I.23	I.20
23	5I	0.320	$5/2^-$	+I.54(I3)	+	I	0	+I.I5	I.34(II)
25	5I	0	$5/2^-$	I.424(4)	+	I	0	+I.27	(+)I.I2
25	53	0	$7/2^-$	I.435(2)	+	I	0	+I.30	(+)I.I0
25	53	0.378	$5/2^-$	+I.30(I2)	+	I	0	+I.2I	I.07(I0)
25	55	0	$5/2^-$	+I.397486(I)	+	I	0	+0.90	I.54
27	55	0	$7/2^-$	+I.378(I)	+	I	0	+I.36	I.0I
27	57	0	$7/2^-$	+I.348(3)	+	I	0	+I.46	0.92
27	57	I.378	$3/2^-$	+I.9(6)	+	I	0	+0.99	I.9(6)
27	59	0	$7/2^-$	+I.322(3)	+	I	0	+0.85	I.56
27	59	I.292	$3/2^-$	+I.II(9)	+	I	0	+0.9I	I.22(I0)

Table 4 (continued)

1	2	3	4	5	6	7	8	9	IO
29	6I	0	$3/2^-$	+I.43(3)	+	I	0	+I.25	I.I4(2)
29	63	0	$3/2^-$	+I.4822(I)	+	I	0	+I.44	I.03
29	65	0	$3/2^-$	+I.5878(2)	+	I	0	+I.43	I.II
3I	67	0	$3/2^-$	+I.2338(2)	+	I	0	+I.52	0.8I
3I	69	0	$3/2^-$	+I.34439(3)	+	I	0	+I.50	0.90
3I	7I	0	$3/2^-$	+I.708I8(I)	+	I	0	+I.48	I.I5
3I	7I	0.5I2	$3/2^-$	0.63(3)	+	I	-I	+0.98	(+)0.64(3)
3I	7I	I.495	$9/2^+$	0.46(7)	+	I	-I	+I.55	(+)0.30(5)
33	7I	0	$5/2^-$	(+)0.6694(7)	+	I	-I	+0.7I	(+)0.94
33	73	0.067	$5/2^-$	+0.65(4)	+	I	-I	+0.67	0.97(6)
33	73	0.428	$9/2^+$	+I.I63(3)	+	I	0	+I.I9	0.98
33	75	0	$3/2^-$	+0.95965(4)	+	I	0	+I.09	0.88
33	75	0.265	$3/2^-$	+0.6I(I6)	+	I	-I	+0.59	I.03(27)
33	75	0.280	$5/2^-$	+0.35(5) +0.94(I3)	+	I	-I	+0.68	0.52(7) I.38(I9)
33	77	0.264	$5/2^-$	+0.34(4) +0.88(36)	+	I	-I	+0.65	0.52(6) I.35(55)
33	77	0.476	$9/2^+$	+I.228(2)	+	I	0	+I.4I	0.87
33	77	0.632	$5/2^+$	+I.0I(I6)	+	I	0	+I.I5	0.86(I4)
35	79	0	$3/2^-$	+I.404266(3)	+	I	0	+I.06	I.32
35	8I	0	$3/2^-$	+I.5I3707(3)	+	I	0	+I.03	I.47
35	8I	0.536	$9/2^+$	I.30(2)	+	I	0	+I.39	(+)0.94(I)
37	8I	0	$3/2^-$	+I.373(I)	+	I	0	+I.05	I.3I
37	83	0	$5/2^-$	+0.5700(3)	+	I	-I	+0.60	0.95
37	85	0	$5/2^-$	+0.5428(4)	+	I	-I	+0.57	0.95
37	85	0.5I4	$9/2^+$	+I.37(I)	+	I	0	+I.25	I.I0(I)
37	87	0	$3/2^-$	+I.834544(I)	+	I	0	+0.98	I.87
39	89	0	$I/2^-$	-0.27483I(I)	-	I	0	-0.29	0.95
39	9I	0	$I/2^-$	0.3282(I6)	-	I	0	-0.29	(+)I.I3(I)
4I	9I	I.985	$I3/2^-$	+I.26(4)	+	I	0	+I.30	0.97(3)
4I	93	0	$9/2^+$	+I.37I22(7)	+	I	0	+I.23	I.I2
4I	95	0	$9/2^+$	I.334(3)	+	I	0	+I.23	(+)I.08
4I	97	0	$9/2^+$	I.6(3)	+	I	0	+I.22	(+)I.3I(25)
43	93	0	$9/2^+$	I.37(I6)	+	I	0	+I.23	(+)I.II(I3)
43	95	0	$9/2^+$	I.293(27)	+	I	0	+I.23	(+)I.05(2)
43	99	0	$9/2^+$	+I.26327(9)	+	I	0	+I.25	I.0I
43	99	0.I4I	$7/2^+$	+I.03(25)	+	I	0	+I.I0	0.94(23)
43	99	0.I8I	$5/2^+$	+I.3I6(25)	+	I	0	+I.I4	I.I5(2)

Table 4 (continued)

1	2	3	4	5	6	7	8	9	IO
45	I0I	0.I57	$9/2^+$	+I.22(2)	+	I	0	+I.35	0.90(2)
45	I03	0	$I/2^-$	-0.I7704(4)	-	I	0	-0.23	0.77
45	I03	0.040	$7/2^+$	+I.22(2)	+	I	0	+I.22	I.00(2)
45	I03	0.093	$9/2^+$	+I.08(I7)	+	I	0	+I.28	0.84(I3)
45	I03	0.295	$3/2^-$	0.65(I9)	+	I	-I	+0.62	(+)I.05(3I)
45	I03	0.357	$5/2^-$	+0.54(3)	+	I	-I	+0.66	0.82(4)
45	I05	0	$7/2^+$	+I.265(4)	+	I	0	+I.08	I.I7
47	I03	0	$7/2^+$	+I.277(I4)	+	I	0	+I.25	I.02(I)
47	I05	0	$I/2^-$	0.203(2)	-	I	0	-0.28	(+)0.73(I)
47	I05	I.734	$I5/2^+$	+0.56(6)	+	I	-I	+0.62	0.94(I0)
47	I07	0	$I/2^-$	-0.227359	-	I	0	-0.25	0.9I
47	I07	0.325	$3/2^-$	+0.58(20)	+	I	-I	+0.55	I.05(36)
47	I07	0.423	$5/2^-$	+0.53(23)	+	I	-I	+0.58	0.9I(40)
47	I09	0	$I/2^-$	-0.26I38I	-	I	0	-0.27	0.97
47	I09	0.088	$7/2^+$	+I.22(4)	+	I	0	+I.08	I.I3(4)
47	I09	0.3II	$3/2^-$	+0.63(2I)	+	I	-I	+0.53	I.I9(40)
47	I09	0.4I5	$5/2^-$	+0.45(2I)	+	I	-I	+0.54	0.83(39)
47	III	0	$I/2^-$	-0.292(4)	-	I	0	-0.29	I.0I(I)
47	II3	0	$I/2^-$	0.3I8(4)	-	I	0	-0.27	(+)I.I8(2)
49	I09	0	$9/2^+$	+I.23I(3)	+	I	0	+I.I8	I.04
49	III	0	$9/2^+$	+I.222(I)	+	I	0	+I.I4	I.07
49	II3	0	$9/2^+$	+I.22864(4)	+	I	0	+I.I0	I.I2
49	II3	0.392	$I/2^-$	-0.42I02(4)	+	I	0	-0.4I$^{bg)}$	I.03
49	II5	0	$9/2^+$	+I.23I29(4)	+	I	0	+I.I7	I.05
49	II5	0.336	$I/2^-$	-0.4880(I)	+	I	0	-0.40$^{b)}$	I.22
49	II5	0.828	$3/2^+$	+0.53(9)	+	I	0	+0.76	0.70(I2)
49	II7	0.3I5	$I/2^-$	-0.50348(6)	+	I	0	-0.40$^{b)}$	I.26
49	II9	0.3II	$I/2^-$	-0.42I00(4)	-	I	0	-0.43	0.98
5I	II5	0	$5/2^+$	+I.384(4)	+	I	0	+I.06	I.3I
5I	II5	I.300	$II/2^-$	+I.004(I3)	+	I	0	+I.07	0.94(I)
5I	II5	2.796	$I9/2^-$	+0.287(4)	+	I	-I	+0.70	0.4I(I)
5I	II7	0	$5/2^+$	+I.384(24)	+	I	0	+I.33	I.04(2)
5I	II7	I.323	$II/2^-$	+0.97I(I7)	+	I	0	+I.I4	0.85(2)
5I	II9	0	$5/2^+$	+I.360(4)	+	I	0	+I.04	I.33
5I	I2I	0	$5/2^+$	+I.3454(I)	+	I	0	+I.04$^{h)}$	I.29
5I	I2I	0.037	$7/2^+$	0.7I9(2)	+	I	-I	+0.59$^{h)}$	(+)I.22
5I	I23	0	$7/2^+$	+0.7285I(6)	+	I	0	+I.00	0.73
5I	I25	0	$7/2^+$	+0.75(I)	+	I	0	+0.99	0.76(I)

Table 4 (continued)

1	2	3	4	5	6	7	8	9	I0
5I	I27	0	$7/2^+$	0.74(3)	+	I	0	+0.97	(+)0.76(3)
53	I23	0	$5/2^+$	I.I27(3)	+	I	0	+I.04h)	(+)I.08
53	I25	0	$5/2^+$	I.I28(2)	+	I	0	+0.96	(+)I.I8
53	I27	0	$5/2^+$	+I.I253I(3)	+	I	0	+0.94	I.20
53	I27	0.058	$7/2^+$	+0.726(I4)	+	I	0	+0.99	0.73(I)
53	I27	0.203	$3/2^+$	+0.767(53)	+	I	0	+0.89	0.86(6)
53	I29	0	$7/2^+$	+0.7479(I)	+	I	0	+0.97	0.77
53	I29	0.028	$5/2^+$	+I.I20(I)	+	I	0	+0.93	I.20
53	I3I	0	$7/2^+$	+0.7834(3)	+	I	0	+0.96	0.82
53	I3I	0.I50	$5/2^+$	+I.I2(20)	+	I	0	+0.92	I.22(22)
53	I33	0	$7/2^+$	+0.8I6(I)	+	I	0	+0.95	0.66
55	I23	0	$1/2^+$	+2.754(I4)	+	I	0	+3.I4ah)	0.88
55	I25	0	$1/2^+$	+2.8I8(I4)	+	I	0	+3.I0ah)	0.9I(I)
55	I27	0	$I/2^+$	+2.9I8(I4)	+	I	0	+3.03ah)	0.96(I)
55	I29	0	$I/2^+$	+2.982(I6)	+	I	0	+3.03ah)	0.98(I)
55	I3I	0	$5/2^+$	+I.4I2(8)	+	I	0	+0.93	I.52(I)
55	I3I	0.I34	$5/2^+$	+0.74(3)	+	I	0	+0.94	0.79(3)
55	I33	0	$7/2^+$	+0.73772I(3)	+	I	0	+0.96	0.77
55	I33	0.08I	$5/2^+$	+I.360(8)	+	I	0	+0.92	I.50(I)
55	I33	0.I6I	$5/2^+$	+0.80(8)	+	I	0	+0.92	0.87(9)
55	I35	0	$7/2^+$	+0.78069(6)	+	I	0	+0.95	0.82
55	I37	0	$7/2^+$	+0.8II8(I)	+	I	0	+0.94	0.86
57	I37	0	$7/2^+$	+0.770(2)	+	I	-I	+0.88	0.88
57	I39	0	$7/2^+$	+0.788990(I)	+	I	-I	+0.96	0.82
59	I4I	0	$5/2^+$	+I.6544(8)	+	I	0	+I.I2	I.48
59	I4I	0.I45	$7/2^+$	+0.89(5)	+	I	-I	+0.72	I.24(7)
59	I4I	I.II8	$II/2^-$	+I.3I(8)	+	I	0	+I.4I	0.93(6)
59	I43	0.057	$5/2^+$	+I.04(8)	+	I	0	+I.I5	0.90(7)
6I	I43	0	$5/2^+$	I.5(2)	+	I	0	+I.I5	(+)I.30(I7)
6I	I43	0.960	$II/2^-$	+I.I4(9)	+	I	0	+I.47	0.78(6)
6I	I43	I.898	$(I5/2^+)$	+I.00(7)	+	I	-I	+I.I9	0.84(6)
6I	I47	0	$7/2^+$	+0.79(2)	+	I	-I	+0.77	I.03(3)
6I	I47	0.09I	$5/2^+$	+I.25(II)	+	I	0	+I.I7	I.07(9)
6I	I49	0	$7/2^+$	0.94(I4)	+	I	-I	+0.76	(+)I.24(I8)
6I	I49	0.II4	$5/2^+$	+I.04(I4)	+	I	0	+I.I7	0.89(I2)
6I	I49	0.2II	$5/2^+$	+0.88(I4)	+	I	0	+I.I7	0.75(I2)
6I	I49	0.270	$7/2^-$	0.63(3)	+	I	-I	+0.78	(+)0.8I(4)
6I	I5I	0	$5/2^+$	0.72(8)	+	I	-I	+0.66	(+)I.09(I2)

Table 4 (continued)

1	2	3	4	5	6	7	8	9	I0
6I	I5I	0.256	$3/2^+$	0.4I(I8)	+	I	-I	+0.55	(+)0.75(33)
63	I47	0	$5/2^+$	I.4(2)	+	I	0	+I.20	(+)I.I7(I7)
63	I47	0.625	$II/2^-$	+I.I0(6)	+	I	-I	+I.03	I.07(6)
63	I49	0.496	$II/2^-$	+I.II(3)	+	I	-I	+I.02	I.09(3)
63	I5I	0	$5/2^+$	+I.3852(2)	+	I	0	+I.20	I.I5
63	I5I	0.022	$7/2^+$	+0.7403(6)	+	I	-I	+0.80	0.92
63	I53	0	$5/2^+$	+0.6I32(3)	+	I	-I	+0.69	0.89
63	I53	0.097	$5/2^-$	+I.29(9)	+	I	0	+I.I9	I.08(8)
63	I53	0.083	$7/2^+$	+0.52(2)	+	I	-I	+0.79	0.66(3)
63	I53	0.I03	$3/2^+$	+0.94(I9)	+	I	0	+I.06	0.89(I6)
63	I55	0.I04	$5/2^-$	+I.00(II)	+	I	0	+I.I8	0.85(9)
65	I55	0	$3/2^+$	I.33(I3)	+	I	0	+0.96	(+)I.36(I4)
65	I57	0	$3/2^+$	I.33(7)	+	I	0	+0.96	(+)I.38(7)
65	I59	0	$3/2^+$	+I.343(3)	+	I	0	+0.9I	I.48
65	I59	0.056	$5/2^+$	0.65(4)	+	I	0	+I.0I	(+)0.64(4)
67	I65	0	$7/2^-$	+I.I92(8)	+	I	0	+I.06	I.I2(I)
67	I65	0.095	$9/2^-$	0.92(4)	+	I	0	+I.I6	(+)0.79(3)
69	I63	0	$I/2^+$	-0.I64(4)	-	I	0	-0.22i)	0.74(2)
69	I65	0	$I/2^+$	-0.278(6)	-	I	0	-0.27i)	I.03(2)
69	I67	0	$I/2^+$	-0.394(4)	-	I	0	-0.27i)	I.46(2)
69	I69	0	$I/2^+$	-0.463(3)	-	I	0	-0.28i)	I.65(I)
69	I69	0.008	$3/2^+$	+0.360(7)	+	I	-I	+0.43i)	0.84(2)
69	I69	0.II8	$5/2^+$	+0.30(2)	+	I	-I	+0.42i)	0.7I(5)
69	I69	0.I39	$7/2^+$	+0.38(2)	+	I	-I	+0.44i)	0.86(5)
69	I69	0.379	$7/2^-$	0.28(2)	+	I	-I	+0.44i)	(+)0.64(5)
69	I7I	0	$I/2^+$	-0.46I(7)	-	I	0	-0.27i)	I.7I(3)
69	I7I	0.I29	$7/2^+$	+0.42(4)	+	I	-I	+0.48	+0.88(8)
69	I7I	0.636	$7/2^+$	+0.62(9)	+	I	-I	+0.48	I.29(I9)
7I	I7I	0	$7/2^+$	0.58(3)	+	I	-I	+0.5I	(+)I.I4(6)
7I	I75	0	$7/2^+$	+0.6379(3)	+	I	-I	+0.55	I.I6
7I	I75	0.II4	$9/2^+$	+0.49(5)	+	I	-I	+0.59	0.83(8)
7I	I75	0.25I	$II/2^+$	+0.36(I3)	+	I	-I	+0.55	0.65(24)
7I	I77	0	$7/2^+$	+0.640(3)	+	I	-I	+0.55	I.I6(I)
7I	I77	0.I22	$9/2^+$	+0.49(I7)	+	I	-I	+0.59	0.83(29)
7I	I77	0.I50	$9/2^-$	+I.22(7)	+	I	0	+I.08	I.I3(6)
7I	I77	0.970	$23/2^-$	0.29(3)	+	I	-I	+0.80	(+)0.36(4)
73	I77	0.I86	$5/2^-$	0.8I(5)	+	I	0	+I.04	(+)0.78(5)
73	I8I	0	$7/2^+$	+0.6774(3)	+	I	0	+0.88	0.77

Table 4 (continued)

1	2	3	4	5	6	7	8	9	IO
73	I8I	0.006	$9/2^-$	+I.I8(2)	+	I	0	+0.87	I.36(2)
73	I8I	0.I36	$9/2^+$	+0.6I(II)	+	I	0	+0.87	0.70(I3)
73	I8I	0.482	$5/2^+$	+I.30(2)	+	I	0	+0.90	I.44(2)
					+	I	0	+I.I7[j]	I.II(2)
75	I8I	0	$5/2^+$	I.276(28)	+	I	0	+I.06	(+)I.20(3)
					+	I	0	+I.20[j]	(+)I.06(2)
75	I8I	0.357	$5/2^-$	0.80(4)	+	I	0	+I.06	(+)0.76(4)
					+	I	0	+I.20[j]	(+)0.67(3)
75	I83	0	$5/2^+$	(+)I.2I(4)	+	I	0	+0.9I	I.33(4)
					+	I	0	+I.I8[j]	I.03(3)
75	I83	0.496	$9/2^-$	+I.I38(20)	+	I	0	+0.89	I.28(2)
					+	I	0	+I.30[j]	0.88(2)
75	I85	0	$5/2^+$	+I.2685(I)	+	I	0	+0.88	I.44
					+	I	0	+I.I7[j]	I.08
75	I85	0.I25	$7/2^+$	+0.60(23)	+	I	0	+0.86	0.70(27)
75	I87	0	$5/2^+$	+I.2879(I)	+	I	0	+0.97	I.33
					+	I	0	+I.I7[j]	I.I0
75	I87	0.I34	$7/2^+$	+0.55(25)	+	I	0	+0.96	0.57(26)
					+	I	-I	0.46	I.20(54)
75	I87	0.206	$9/2^-$	+I.I3(I)	+	I	0	+0.94	I.20(I)
77	I9I	0.082	$I/2^+$	+I.083(9)	+	I	0	+0.95	I.I4(I)
					+	I	-I	+I.2I[ab]	0.90(I)
77	I9I	0.I29	$5/2^+$	+0.24(3)	+	I	-I	+0.53	0.45(6)
77	I9I	0.I7I	$II/2^-$	I.096(7)	+	I	-I	+0.66	(+)I.66(I)
					+	I	0	+I.I6	(+)0.94(I)
77	I9I	0.I79	$3/2^+$	+0.93(25)	+	I	0	+0.99	0.94(25)
77	I93	0.073	$I/2^+$	+0.940(2)	+	I	0	+0.94	I.00
					+	I	-I	+I.2I[ab]	0.78
77	I93	0.I39	$5/2^+$	+0.29(5)	+	I	-I	+0.52	0.56(I0)
77	I93	0.I80	$3/2^+$	+0.73(28)	+	I	0	+0.98	0.74(29)
79	I97	0.077	$I/2^+$	+0.840(8)	+	I	0	+0.94	0.89(I)
8I	I95	0	$I/2^+$	+3.32(26)	+	I	0	+3.66[a]	0.9I(7)
8I	I97	0	$I/2^+$	+3.32(26)	+	I	0	+3.66[a]	0.9I(7)
8I	I99	0	$I/2^+$	+3.28(22)	+	I	0	+3.65[a]	0.90(6)
8I	20I	0	$I/2^+$	+3.32(24)	+	I	0	+3.65[a]	0.9I(7)
8I	203	0	$I/2^+$	+3.2445I4	+	I	0	+3.65[a]	0.89
8I	205	0	$I/2^+$	+3.276427	+	I	0	+3.64[a]	0.90
8I	205	0.204	$3/2^+$	0.27(3)	+	I	-I	+0.47	(+)0.57(6)

Table 4 (continued)

1	2	3	4	5	6	7	8	9	IO
8I	205	2.623	$5/2^-$	0.28(6)	+	I	-I	+0.5I	(+)0.55(I2)
83	203	0	$9/2^-$	+I.03(I)	+	I	0	+I.06	0.97(I)
83	205	0	$9/2^-$	+0.92(2)	+	I	0	+I.05	0.88(2)
83	207	0	$9/2^-$	0.9II(4)	+	I	0	+I.04	(+)0.88
83	207	2.I02	$2I/2^+$	+0.325(6)	+	I	-I	+0.37	0.88(2)
83	209	0	$9/2^-$	+0.95(I)	+	I	0	+I.04	0.9I(I)
83	209	2.563	$9/2^+$	0.78(I6)	+	I	0	+I.04	(+)0.75(I5)
83	209	2.74I	$I5/2^+$	0.83(I6)	+	I	-I	+0.65	(+)I.28(25)
					+	I	0	+I.I5	(+)0.72(I4)
83	2II	0.405	$7/2^-$	+I.29(20)	+	I	0	+0.96	I.34(2I)
85	2II	I.4I7	$2I/2^-$	+0.9I7(I6)	+	I	-I	+0.88	I.04(2)
87	2I3	I.590	$2I/2^-$	0.888(4)	+	I	-I	+0.88	(+)I.0I
87	2I3	2.536	$29/2^+$	I.039(2)	+	I	-I	+0.95	(+)I.09
87	2I3	4.993	$45/2^-$	0.990(25)	+	I	-I	+I.26	(+)0.79(2)
89	227	0	$3/2^-$	+0.73(7)	+	I	0	+0.88	0.83(8)
9I	23I	0	$3/2^-$	I.34(I)	+	I	0	+I.I6	(+)I.I6(I)
93	237	0	$5/2^+$	+I.26(2)	+	I	0	+I.02	I.24(2)
93	237	0.060	$5/2^-$	+0.67(I)	+	I	-I	+0.79	0.85(I)
95	24I	0	$5/2^-$	+0.64(I)	+	I	-I	+0.54	I.I8(2)
95	243	0	$5/2^-$	+0.64(2)	+	I	-I	+0.54	I.I8(4)
97	249	0	$7/2^+$	I.46(20)	+	I	0	+I.08	(+)I.35(I8)
99	253	0	$7/2^+$	+I.I7(2)	+	I	0	+I.I3	I.04(2)

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[a] $g_p^{eff} = g_p^{free}$.

[b] $g_n^{eff} = g_n^{free}$.

[c] Instead of $Ip_{I/2}$, the proton subshell $Id_{5/2}$ is filled.

[d] Instead of $Id_{5/2}$, the subshells $2s_{I/2}$ are filled.

[e] Instead of $2s_{I/2}$, the proton subshell $Id_{3/2}$ is filled.

[f] Instead of $2s_{I/2}$, the neutron subshell $Id_{3/2}$ is filled.

[g] Instead of $2d_{5/2}$, the neutron subshell $2d_{3/2}$ is filled.

[h] Instead of $3s_{I/2}$, the neutron subshell $Ih_{II/2}$ is filled.

[i] Instead of $3s_{I/2}$, the proton subshell $Ih_{II/2}$ is filled.

[j] For the nuclei with N=108,the calculation was made assuming that the neutron number is magic.All these nuclei have values of $g^{s}1/2$ which are close to zero,$-0.051 \leq g^{s}1/2 \leq 0.074$ (see text).

Table 5

Gyromagnetic ratios of even-odd nuclei

Z	A	E^{lev}, MeV	J^{π}	g^{exp}	sign	$g^{l,eff}$ p	n	g_1^{calc}	g^{exp}/g_1^{calc}
I	2	3	4	5	6	7	8	9	IO
4	9	0	$3/2^-$	-0.78493(2)	-	I	0	-0.25[a]	3.I4
6	II	0	$3/2^-$	-0.685(7)	-	I	0	-0.75[a]	0.9I(I)
6	I3	0	$I/2^-$	+I.404768(4)	+	I	0	+I.67	0.84
6	I3	3.854	$5/2^+$	(-)0.59(5)	-	I	0	-0.59[a]	I.00(8)
6	I5	0.740	$5/2^+$	-0.77(6)	-	I	0	-0.53[a]	I.45(II)
8	I5	0	$I/2^+$	+I.4378(I6)	+	I	0	+0.99	I.45
8	I9	0.096	$3/2^+$	-0.48(6)	{ -	I	0	-0.60[a]	0.80(I0)
					-	I	0	-0.39	I.23(I5)
I0	I9	0	$I/2^+$	-3.774(2)	-	I	0	-3.67[bc]	I.03
I0	2I	0	$3/2^+$	-0.44II97(3)	-	I	0	-0.40	I.I0
I0	2I	0.350	$5/2^+$	0.I96(I4)	-	I	0	-0.I7	(+)I.I5(8)
I0	23	0	$5/2^+$	-0.432(4)	-	I	0	-0.50[a]	0.86(8)
I2	25	0	$5/2^+$	-0.342I8(3)	-	I	0	-0.35[a]	0.98
I4	29	0	$I/2^+$	-I.II058(6)	-	I	0	-I.I8[bd]	0.94
I6	3I	0	$I/2^+$	0.97586(I6)	-	I	0	-I.27[bd]	(-)0.77
I6	33	0	$3/2^+$	+0.4292I4(I)	+	I	-I	+0.67	0.64
I6	35	0	$3/2^+$	+0.028(7)	+	I	-I	+0.30	0.09(2)
		0	$3/2^+$	0.7I(3)					
I8	35	0	$3/2^+$	+0.422(I)	+	I	-I	+0.67	0.63
I8	37	0	$3/2^+$	+0.63(I3)	+	I	-I	+0.7I	0.89(I8)
I8	37	I.6II	$7/2^-$	-0.38(I)	-	I	0	-0.28[a]	I.36(4)
I8	39	0	$7/2^-$	-0.37(9)	-	I	0	-0.32[a]	I.I6(28)
20	39	0	$3/2^+$	0.68II(I)	+	I	-I	+0.65	(+)I.05
20	4I	0	$7/2^-$	-0.45565I(3)	-	I	0	-0.33[a]	I.38
20	4I	3.830	$I5/2^+$	+0.29(2)	+	I	-I	+0.28	I.04(7)
20	43	0	$7/2^-$	-0.376469(2)	-	I	0	-0.30[a]	I.26
22	45	0	$7/2^-$	0.027I(6)	-	I	0	-0.38[a]	(+)0.07
22	45	0.330	$3/2^+$	0.65(I6)	+	I	-I	+0.57	(+)I.I4(28)
22	47	0	$5/2^-$	-0.3I5392(4)	-	I	0	-0.3I	I.02
22	47	0.I59	$7/2^-$	-0.55(I7)	-	I	0	-0.6I[a]	0.90(28)
22	49	0	$7/2^-$	-0.3I5477(3)	-	I	0	-0.34[a]	0.93
24	49	0	$5/2^-$	0.I90(I)	-	I	0	-0.I6	(-)I.I9(I)
24	5I	0	$7/2^-$	-0.2669(I4)	-	I	0	-0.42[a]	0.64
24	5I	0.749	$3/2^-$	-0.57(8)	-	I	0	-0.44[a]	I.30(I8)
24	53	0	$3/2^-$	-0.3I636(2)	-	I	0	-0.47[a]	0.67
26	55	0.93I	$5/2^-$	+I.08(48)	+	I	-I	+0.8I	I.33(59)
26	57	0	$I/2^-$	+0.I8I246	+	I	-I	+0.22[ab]	0.82
26	57	0.0I4	$3/2^-$	-0.I033(I)	-	I	0	-0.24	0.43
26	57	0.I36	$5/2^-$	+0.366(I8)	+	I	-I	+0.38	0.96(5)
28	57	0	$3/2^-$	0.587(40)	-	I	0	-0.56[a]	(+)I.05(7)
28	59	0.339	$5/2^-$	+0.I4(5)	+	I	-I	+0.20[a]	0.70(25)
28	6I	0	$3/2^-$	-0.5000I(3)	-	I	0	-0.44[a]	I.I4
28	6I	0.067	$5/2^-$	+0.I92(3)	+	I	-I	+0.33[a]	0.58(I)
28	65	0	$5/2^-$	0.28(3)	+	I	-I	+0.34[a]	(+)0.82(9)
30	63	0	$3/2^-$	-0.I8776(3)	-	I	0	-0.22	0.85
30	65	0	$5/2^-$	+0.3076(I)	+	I	-I	+0.46[a]	0.67
30	65	0.207	$3/2^-$	-0.49(I6)	-	I	0	-0.48[a]	I.02(33)
30	65	I.066	$9/2^+$	-0.38(II)	-	I	0	-0.44[a]	0.86(25)
30	67	0	$5/2^-$	+0.350433	+	I	0	+0.46[a]	0.76
30	67	0.I85	$3/2^-$	+0.25(8)	-	I	0	-0.20	-I.25(40)
30	67	0.604	$9/2^+$	-0.244(2)	-	I	0	-0.I6	I.52(I)
32	67	0.734	$9/2^+$	-0.2II(7)	-	I	0	-0.30	0.70(2)
32	69	0.398	$9/2^+$	-0.222(I)	-	I	0	-0.30	0.74
32	7I	0	$I/2^-$	+I.094(I0)	+	I	0	+I.3I	0.84(I)
32	7I	0.I75	$5/2^-$	+0.407(4)	+	I	-I	+0.9I[a]	0.44
32	7I	0.I99	$9/2^+$	-0.23I4(2)	-	I	0	-0.26	0.89
32	73	0	$9/2^+$	-0.I95437	-	I	0	-0.24	0.8I
32	73	0.0I3	$5/2^+$	-0.0376(I0)	-	I	0	-0.23	0.I6
32	75	0	$I/2^-$	+I.02(I)	+	I	0	+I.I9	0.86(I)
34	77	0	$I/2^-$	+I.0685	+	I	0	+0.98	I.09
34	77	0.250	$5/2^-$	+0.48(6)	+	I	-I	+0.66	0.73(9)
34	77	0.439	$5/2^-$	+0.4I(II)	+	I	-I	+0.66	0.62(I7)
36	83	0	$9/2^+$	-0.2I5704	-	I	0	-0.28	0.77
36	83	0.009	$7/2^+$	-0.269I(6)	-	I	0	-0.28	0.96
36	85	0	$9/2^+$	-0.2222(4)	-	I	0	-0.30	(+)0.74
38	87	0	$9/2^+$	-0.243023	-	I	0	-0.29	0.84
40	9I	0	$5/2^+$	-0.52I45(I)	-	I	0	-0.53[a]	0.98
42	93	2.425	$2I/2^+$	(+)0.877(20)	+	I	-I	+I.08	0.8I(2)
42	95	0	$5/2^+$	-0.36568(5)	-	I	0	-0.28	I.3I
42	95	0.204	$3/2^+$	-0.26(2)	-	I	0	-0.28	0.93(7)
42	97	0	$5/2^+$	-0.37340(4)	-	I	0	-0.28	I.33
42	99	0.098	$5/2^+$	-0.3I0(2)	-	I	0	-0.29	I.07(I)

Table 5 (continued)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	IO
44	95	2.279(I7/2$^+$)		+0.825(I6)	+	I	-I	+0.99	0.83(2)
44	97	0	5/2$^+$	(-)0.306(8)	-	I	0	-0.26	I.I8(3)
44	99	0	5/2$^+$	-0.256(2)	-	I	0	-0.25	I.02(I)
44	99	0.090	3/2$^+$	0.26I(8)	-	I	0	-0.25	(+)I.04(3)
				-0.I89(4)					0.76(2)
44	I0I	0	5/2$^+$	-0.288(2)	-	I	0	-0.26	I.II(I)
44	I0I	0.I27	3/2$^+$	-0.207(I7)	-	I	0	-0.26	0.80(7)
44	I03	0	5/2$^+$	-0.268(4)	-	I	0	-0.30	0.89(I)
44	I05	0	3/2$^+$	0.2I$(^{8}_{20})$	-	I	0	-0.3I	(-)0.68$(^{I8}_{53})$
46	I03	0.784	II/2$^-$	-0.I92(I4)	-	I	0	-0.22	0.87(6)
46	I05	0	5/2$^+$	-0.257(I)	-	I	0	-0.26	0.99
46	I05	0.280	3/2$^+$	0.46(7)	+	I	-I	+0.55	(+)0.84(I3)
					-	I	0	-0.5Ia)	(+)0.90(I4)
46	I05	0.644	7/2$^-$	0.49(8)	-	I	0	-0.52a)	(+)0.94(I5)
48	I05	0	5/2$^+$	-0.296(12)	-	I	0	-0.I9	I.56(6)
48	I07	0	5/2$^+$	-0.246022	-	I	0	-0.23	I.07
48	I07	0.846	II/2$^-$	-0.20I(4)	-	I	0	-0.27	0.74(2)
48	I09	0	5/2$^+$	-0.33II38(I)	-	I	0	-0.26	I.27
48	I09	0.463	II/2$^-$	-0.I993(4)	-	I	0	-0.28	0.7I
48	III	0	I/2$^+$	-I.I898	+	I	-I	-I.I6b)	I.03
48	III	0.245	5/2$^+$	-0.3I8(2)	-	I	0	-0.28	I.I4(I)
48	III	0.396	II/2$^-$	-0.20093(7)	-	I	0	-0.28	0.72
48	II3	0	I/2$^+$	-I.2446	+	I	-I	-0.98b)	I.27
48	II3	0.264	II/2$^-$	-0.I97779	-	I	0	-0.25	0.79
48	II5	0	I/2$^+$	-I.2968	+	I	-I	-0.98b)	I.32
48	II5	0.I73	II/2$^-$	-0.I89279	-	I	0	-0.33	0.57
50	III	0.979	II/2$^-$	-0.23(2)	-	I	0	-0.24	0.96(8)
50	II3	0	I/2$^+$	I.76(2)	+	I	-I	-I.72b)	(+)I.02(I)
50	II3	0.739	II/2$^-$	-0.235(4)	-	I	0	-0.27	0.87(2)
50	II5	0	I/2$^+$	-I.8358	+	I	-I	-0.96b)	I.9I
					-	I	0	-I.84ab)	I.00
50	II5	0.6I3	7/2$^+$	+0.I95(3)	-	I	0	-0.26	-0.75(I)
50	II5	0.7I4	II/2$^-$	-0.2489(7)	-	I	0	-0.27	0.92
50	II7	0.I59	3/2$^+$	+0.45$(^{I5}_{30})$	+	I	-I	+0.58	0.78$(^{26}_{52})$
50	II9	0	I/2$^+$	-2.0926	+	I	-I	-I.48bf)	I.4I
					+	I	0	-2.72bf)	0.77
50	II9	0.024	3/2$^+$	+0.459(2)	+	I	0	+0.70	0.66
50	II9	0.090	II/2$^-$	-0.254(I5)	-	I	0	-0.26f)	0.96(6)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	IO
50	I2I	0	3/2$^+$	0.466(5)	+	I	-I	+0.48	(+)0.97(I)
52	II9	0	I/2$^+$	(-)0.50(I0)	+	I	0	-0.34b)	(+)I.47(29)
52	I23	0	I/2$^+$	-I.47I7(3)	+	I	0	-I.08b)	I.36
52	I23	0.159	3/2$^+$	0.48(8)	+	I	-I	+0.4I	(+)I.I7(20)
52	I23	0.248	II/2$^-$	-0.I82(9)	-	I	0	-0.36	0.5I(3)
52	I23	0.440	3/2$^+$	0.34(6)	+	I	-I	+0.4I	(+)0.63(I5)
52	I25	0	I/2$^+$	-I.7766(I)	+	I	-I	-I.59b)	I.I2
52	I25	0.036	3/2$^+$	+0.403(3)	+	I	-I	+0.40	I.0I
52	I25	0.I45	II/2$^-$	-0.I69(9)	-	I	0	-0.36	0.47(3)
					-	I	-I	-0.I8g)	0.94(5)
52	I25	0.32I	9/2$^-$	-0.204(7)	-	I	0	-0.37	0.55(2)
52	I25	0.443	3/2$^+$	0.39(6)	+	I	-I	+0.40	0.98(I5)
52	I25	0.463	5/2$^+$	+0.32(I2)	+	I	-I	+0.40	0.80(30)
				-0.23(II)	-	I	0	-0.35	0.66(3I)
52	I25	0.525	9/2$^-$	-	-	I	0	-0.37	
52	I27	0	3/2$^+$	0.423(3)	+	I	-I	+0.38	(+)I.II(I)
52	I27	0.088	II/2$^-$	-0.I66(9)	-	I	0	-0.36	0.46(3)
					-	I	-I	-0.I7g)	0.98(5)
52	I27	0.34I	9/2$^-$	-0.2I4(I4)	-	I	0	-0.36	0.59(4)
52	I29	0	3/2$^+$	0.468(3)	+	I	-I	+0.37	(+)I.26(I)
52	I29	0.I06	II/2$^-$	-0.209(9)	-	I	0	-0.36	0.58(3)
					-	I	-I	-0.I6g)	I.3I(6)
52	I3I	0	3/2$^+$	0.464(6)	+	I	-I	+0.36	I.29(2)
54	I29	0	I/2$^+$	-I.5560	+	I	-I	-I.60b)	0.97
54	I29	0.040	3/2$^+$	+0.39(6)	+	I	-I	+0.34	I.I5(I8)
					+	I	0	+0.84	0.46(7)
54	I3I	0	3/2$^+$	+0.46I24I(3)	+	I	-I	+0.37	I.25
54	I3I	0.I64	II/2$^-$	-0.I45(I8)	-	I	0	-0.37	0.39(5)
					-	I	-I	-0.I6g)	0.9I(II)
54	I33	0.233	II/2$^-$	-0.I58(22)	-	I	0	-0.37	0.43(6)
					-	I	-I	-0.I5	I.05(I5)
56	I33	0	I/2$^+$	-I.552(4)	+	I	-I	-I.6I	0.96
56	I33	0.288	II/2$^-$	-0.I65(7)	+	I	0	-0.37	0.45(2)
					-	I	-I	-0.I5	I.I0(5)
56	I35	0	3/2$^+$	+0.554892(3)	+	I	0	+0.86	0.64
56	I37	0	3/2$^+$	+0.620717(5)	+	I	0	+0.85	0.73
58	I37	0	3/2$^+$	0.6I(I0)	+	I	0	+0.87	(+)0.70(I2)
58	I37	0.254	II/2$^-$	0.I27(6)	-	I	0	-0.37	(+)0.34(2)
					-	I	-I	-0.I4g)	(+)0.9I(4)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	I0
50	I2I	0	$3/2^+$	0.466(5)	+	I	-I	+0.48	(+)0.97(I)
52	II9	0	$I/2^+$	(-)0.50(I0)	+	I	0	-0.34[b]	(+)I.47(29)
52	I23	0	$I/2^+$	-I.47I7(3)	+	I	0	-I.08[b]	I.36
52	I23	0.159	$3/2^+$	0.48(8)	+	I	-I	+0.4I	(+)I.I7(20)
52	I23	0.248	$II/2^-$	-0.I82(9)	-	I	0	-0.36	0.5I(3)
52	I23	0.440	$3/2^+$	0.34(6)	+	I	-I	+0.4I	(+)0.83(I5)
52	I25	0	$I/2^+$	-I.7766(I)	+	I	-I	-I.59[b]	I.I2
52	I25	0.036	$3/2^+$	+0.403(3)	+	I	-I	+0.40	I.0I
52	I25	0.I45	$II/2^-$	-0.I69(9)	-	I	0	-0.36	0.47(3)
					-	I	-I	-0.I8[g]	0.94(5)
52	I25	0.32I	$9/2^-$	-0.204(7)	-	I	0	-0.37	0.55(2)
52	I25	0.443	$3/2^+$	0.39(6)	+	I	-I	+0.40	0.98(I5)
52	I25	0.463	$5/2^+$	+0.32(I2)	+	I	-I	+0.40	0.80(30)
				-0.23(II)	-	I	0	-0.35	0.66(3I)
52	I25	0.525	$9/2^-$	-	-	I	0	-0.37	
52	I27	0	$3/2^+$	0.423(3)	+	I	-I	+0.38	(+)I.II(I)
52	I27	0.088	$II/2^-$	-0.I66(9)	-	I	0	-0.36	0.46(3)
					-	I	-I	-0.I7[g]	0.98(5)
52	I27	0.34I	$9/2^-$	-0.2I4(I4)	-	I	0	-0.36	0.59(4)
52	I29	0	$3/2^+$	0.466(3)	+	I	-I	+0.37	(+)I.26(I)
52	I29	0.I06	$II/2^-$	-0.209(9)	-	I	0	-0.36	0.58(3)
					-	I	-I	-0.I6[g]	I.3I(5)
52	I3I	0	$3/2^+$	0.464(6)	+	I	-I	+0.36	I.29(2)
54	I29	0	$I/2^+$	-I.5560	+	I	-I	-I.60[b]	0.97
54	I29	0.040	$3/2^+$	+0.39(6)	+	I	-I	+0.34	I.I5(I8)
					+	I	0	+0.84	0.46(7)
54	I3I	0	$3/2^+$	+0.46I24I(3)	+	I	-I	+0.37	I.25
54	I3I	0.I64	$II/2^-$	-0.I45(I8)	-	I	0	-0.37	0.39(5)
					-	I	-I	-0.I6[g]	0.9I(II)
54	I33	0.233	$II/2^-$	-0.I58(22)	-	I	0	-0.37	0.43(5)
					-	I	-I	-0.I5	I.05(I5)
56	I33	0	$I/2^+$	-I.552(4)	+	I	-I	-I.6I	0.96
56	I33	0.288	$II/2^-$	-0.I65(7)	+	I	0	-0.37	0.45(2)
					-	I	-I	-0.I5	I.I0(5)
56	I35	0	$3/2^+$	+0.554892(3)	+	I	0	+0.86	0.64
56	I37	0	$3/2^+$	+0.620717(5)	+	I	0	+0.85	0.73
58	I37	0	$3/2^+$	0.6I(I0)	+	I	0	+0.87	(+)0.70(I2)
58	I37	0.254	$II/2^-$	0.I27(6)	-	I	0	-0.37	(+)0.34(2)
					-	I	-I	-0.I4[g]	(+)0.9I(4)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	I0
58	I39	0	$3/2^+$	0.54(I3)	+	I	0	+0.86	(+)0.74(I5)
58	I4I	0	$7/2^-$	0.374(57)	-	I	0	-0.36	(+)I.04(I6)
58	I43	0	$3/2^-$	0.67(20)	-	I	0	-0.52	(+)I.29(38)
60	I43	0	$7/2^-$	-0.304(2)	-	I	0	-0.28	I.09(I)
60	I45	0	$7/2^-$	-0.I87(I)	-	I	0	-0.28	0.67
60	I45	0.073	$5/2^-$	-0.I28(2)	-	I	0	-0.28	0.46(I)
60	I47	0	$5/2^-$	0.268(28)	-	I	0	-0.28	(+)0.96(I0)
62	I45	0	$7/2^-$	0.263(I7)	-	I	0	-0.24	(+)I.I0(7)
62	I47	0	$7/2^-$	-0.23I7(4)	-	I	0	-0.24	0.96
62	I47	0.I2I	$5/2^-$	-0.I8(I)	-	I	0	-0.25	0.72(4)
62	I47	0.I97	$3/2^-$	-0.I8(4)	-	I	0	-0.29	0.62(I4)
62	I49	0	$7/2^-$	-0.I9I9(2)	-	I	0	-0.23	0.83
62	I49	0.023	$5/2^-$	-0.2500(4)	-	I	0	-0.22	I.I4
62	I5I	0	$5/2^-$	0.I449(2)	-	I	0	-0.25	(+)0.58
62	I5I	0.092	$9/2^+$	-0.2I(I)	-	I	0	-0.2I	I.00(5)
62	I5I	0.I05	$3/2^-$	-0.2I(7)	-	I	0	-0.26	0.8I(27)
62	I5I	0.I68	$5/2^+$	0.35(7)	-	I	0	-0.25	(+)I.40(28)
64	I49	0.I65	$5/2^-$	-0.32(I2)	-	I	0	-0.29	I.I0(4I)
64	I5I	0.I08	$5/2^-$	-0.50(7)	-	I	0	-0.2I	2.38(33)
64	I53	0.II0	$5/2^-$	+0.I2(6)	-	I	0	-0.2I	-0.57(29)
64	I53	0.I29	$3/2^-$	+0.22(8)	+	I	-I	+0.32	0.69(25)
					-	I	0	-0.23	-0.96(35)
64	I55	0	$3/2^-$	-0.I727(3)	-	I	0	-0.23	0.75
64	I55	0.086	$5/2^+$	-0.38(3)	-	I	0	-0.42[a]	0.90(7)
				-0.2I3(2)	-	I	0	-0.2I	I.0I(I)
64	I55	0.I05	$3/2^+$	+0.093(I3) -0.347(I3)	-	I	0	-0.23	-0.40(6) I.5I(6)
64	I57	0	$3/2^-$	-0.2265(5)	-	I	0	-0.25	0.9I
64	I57	0.064	$5/2^+$	-0.I66(5)	-	I	0	-0.23	0.8I(2)
64	I59	0	$3/2^-$	-0.29(2)	-	I	0	-0.25	I.I6(8)
66	I53	0	$7/2^-$	-0.206(3)	-	I	0	-0.23	0.90(I)
66	I55	0	$3/2^-$	-0.23(2)	-	I	0	-0.29	0.79(7)
66	I57	0	$3/2^-$	-0.2I3(I3)	-	I	0	-0.26	0.82(5)
66	I6I	0	$5/2^+$	-0.I92(2)	-	I	0	-0.27	0.7I(I)
66	I6I	0.026	$5/2^-$	-0.238(3)	-	I	0	-0.27	0.88(II)
66	I6I	0.044	$7/2^+$	-0.0400(I4)	-	I	-I	+0.055[a]	-0.73(3)
66	I6I	0.075	$3/2^-$	-0.273(5)	-	I	0	-0.28	0.98(2)
66	I63	0	$5/2^-$	+0.2690(I4)	-	I	0	-0.26	-I.04(I)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	I0
66	I65	0	$7/2^{+}$	-0.I48(2)	-	I	0	-0.26	0.57(I)
68	I57	0.422	$I7/2^{+}$	0.05(5)	+	I	-I	-0.06	(+)0.8(9)
68	I6I	0	$3/2^{-}$	-0.247(3)	-	I	0	-0.30	0.82(I)
68	I63	0	$5/2^{-}$	+0.228(8)	-	I	0	-0.26	-0.8I(3)
68	I65	0	$5/2^{-}$	0.26I(9)	-	I	0	-0.27	(+)0.97(3)
68	I65	0.243	$3/2^{-}$	+0.4I(I5)	+	I	-I	+0.39	I.05(35)
68	I67	0	$7/2^{+}$	-0.I6I9(7)	-	I	0	-0.25	0.65
68	I69	0	$I/2^{-}$	+0.972(6)	+	I	0	+0.88	I.I0(I)
68	I7I	0	$5/2^{-}$	-0.264(5)	-	I	0	-0.25	I.06(2)
70	I69	0	$7/2^{+}$	-0.I8I4(3)	-	I	0	-0.26h)	0.70
70	I7I	0	$I/2^{-}$	+0.98734(2)	+	I	0	+0.92h)	I.07
70	I7I	0.067	$3/2^{-}$	0.2325(I6)	-	I	0	-0.29h)	(+)0.80(I)
70	I7I	0.076	$5/2^{-}$	+0.406(2)	-	I	0	-0.29h)	-I.40(I)
70	I7I	0.648	$I7/2^{+}$	0.04II(4)	-	I	-I	+0.05a)	(+)0.82(6)
70	I73	0	$5/2^{-}$	-0.27098(I)	-	I	0	-0.24h)	I.I3
70	I73	0.079	$7/2^{-}$	-0.057(20)	-	I	-I	-0.046g)	I.24(43)
70	I73	0.179	$9/2^{-}$	+0.067(89)	-	I	-I	+0.08ah)	0.8(II)
70	I73	0.35I	$7/2^{+}$	-0.20(20)	-	I	0	-0.24h)	0.83(83)
70	I75	0	$7/2^{-}$	-0.043(II) 0.I66(23)	-	I	-I	-0.04Ig)	I.05(27) (+)4.I(6)
72	I75	0	$5/2^{-}$	0.28(4)	-	I	0	-0.I9	(+)I.47(2I)
72	I77	0	$7/2^{-}$	+0.2258(2)	-	I	0	-0.I8	-1.25
72	I77	0.II3	$9/2^{-}$	+0.240(9)	+	I	-I	+0.57	0.42(2)
72	I77	0.250	$II/2^{-}$	+0.28(8)	+	I	-I	+0.62	0.45(I3)
72	I77	0.32I	$9/2^{+}$	-0.I6(2)	-	I	0	-0.I7	0.94(I2)
72	I79	0	$9/2^{+}$	-0.I424(3)	-	I	0	-0.20	0.7I
74	I83	0	$I/2^{-}$	+0.235569	+	I	-I	+0.4I +0.20a)	0.58 I.I8
74	I83	0.046	$3/2^{-}$	-0.I76(53)	-	I	0	-0.22	0.80(24)
74	I83	0.099	$5/2^{-}$	+0.404(25)	+	I	-I	+0.39	I.04(6)
74	I87	0	$3/2^{-}$	0.459(I4)	+	I	-I	+0.48	(+)0.96(3)
76	I87	0	$I/2^{-}$	+0.I29304	+	I	-I	+0.23a)	0.56
76	I89	0	$3/2^{-}$	+0.439955(3)	+	I	-I	+0.49	0.90
76	I89	0.036	$I/2^{-}$	+0.45(6)	+	I	-I	+0.45	I.00(I3)
76	I89	0.070	$5/2^{-}$	+0.394(3)	+	I	-I	+0.53	0.74(I)
76	I89	0.095	$3/2^{-}$	-0.2I3(3I)	-	I	0	-0.20	1.06(I5)
78	I89	0	$3/2^{-}$	0.27(2)	-	I	0	-0.2I	(+)I.29(I0)
78	I9I	0	$3/2^{-}$	$0.30(^{9}_{3})$	-	I	0	-0.2I	$(+)I.43(^{43}_{I4})$

Table 5 (continued)

1	2	3	4	5	6	7	8	9	I0
78	I95	0	$I/2^{-}$	(+)I.2440(6)	+	I	0	+0.94	I.32
78	I95	0.099	$3/2^{-}$	-0.4I(4)	-	I	0	-0.22	I.86(I8)
78	I95	0.I30	$5/2^{-}$	+0.364(32)	+	I	-I	+0.52	0.70(6)
78	I95	0.239	$5/2^{-}$	+0.2I(2)	+	I	-I	+0.52	0.40(4)
78	I95	0.259	$I3/2^{+}$	0.09I8(23)	-	I	0	-0.I7	(+)0.54(I)
78	I97	0	$I/2^{-}$	I.02(4)	+	I	0	+0.93	(+)I.I0(4)
80	I8I	0	$I/2^{(-)}$	+I.0I4(I)	+	I	0	+I.02	0.99
80	I83	0	I/2	+I.05(I)	+	I	0	+I.0I	I.04(I)
80	I85	0	$I/2^{-}$	+I.0I4(8)	+	I	0	+I.0I	I.00
80	I87	0	$3/2^{-}$	-0.395(3)	-	I	0	-0.47a)	0.84(I)
80	I89	0	$3/2^{-}$	-0.4057(5)	-	I	0	-0.46a)	0.88
80	I93	0	$3/2^{-}$	-0.4I84(I)	-	I	-I	-0.44	0.95
80	I93	0.I4I	$I3/2^{+}$	-0.I62835	-	I	0	-0.I7	0.96
80	I95	0	$I/2^{-}$	+I.0830	+	I	0	+0.96	I.I3
80	I95	0.I76	$I3/2^{+}$	-0.I607I5	-	I	0	-0.I6	I.00
80	I97	0	$I/2^{-}$	+I.0548	+	I	0	+0.95	I.II
80	I97	0.I34	$5/2^{-}$	+0.45(I3)	+	I	-I	+0.53	0.85(24)
80	I97	0.299	$I3/2^{+}$	-0.I58I05	-	I	0	-0.I8	0.88
80	I99	0	$I/2^{-}$	+0.9958(2)	+	I	0	+0.94	I.06
80	I99	0.I58	$5/2^{-}$	+0.42(3)	+	I	-I	+0.53	0.79(6)
80	I99	0.532	$I3/2^{+}$	-0.I56I08	-	I	0	-0.I9	0.82
80	20I	0	$3/2^{-}$	-0.373483	-	I	0	-0.45a)	0.83
80	203	0	$5/2^{-}$	+0.33958(5)	+	I	-I	+0.5I	0.67
80	205	0	$I/2^{-}$	+I.2020(2)	+	I	0	+0.92	I.3I
82	205	I.0I4	$I3/2^{+}$	-0.I50(6)	-	I	0	-0.22	0.68(3)
82	207	0	$I/2^{-}$	+I.I852	+	I	0	+0.93	I.27
82	207	0.570	$5/2^{-}$	+0.320(I2)	+	I	-I	+0.5I	0.63(2)
84	205	0.880	$I3/2^{+}$	-0.I47(7)	-	I	0	-0.20	0.74(4)
84	207	I.II5	$I3/2^{+}$	-0.I43(2)	-	I	0	-0.2I	0.68(I)
84	209	0	$I/2^{-}$	+I.52	+	I	0	+0.88	I.73
84	209	I.473	$17/2^{-}$	+0.9I2(6)	+	I	0	+0.82	I.II(I)
84	209	4.265	$3I/2^{-}$	+0.624(5)	+	I	-I	+0.98	0.64(I)
88	223	0.050	$3/2^{-}$	+0.29(4)	+	I	-I	+0.37	0.78(II)
90	229	0	$5/2^{+}$	+0.I84(I6)	+	I	-I	+0.34	0.54(5)
92	233	0	$5/2^{+}$	+0.26(4)	+	I	-I	+0.33	0.79(I2)
92	235	0	$7/2^{-}$	-0.I0	+ -	I I	-I 0	+0.44 -0.29	-0.23 0.34
94	239	0	$I/2^{+}$	+0.406(8)	+	I	-I	+0.4I	0.99(2)

Table 5 (continued)

1	2	3	4	5	6	7	8	9	IO
94	239	0.286	$5/2^+$	-0.445(3I)	-	I	0	-0.29	I.53(II)
94	24I	0	$5/2^+$	-0.286(8)	-	I	0	-0.29	0.99(3)

a) $g_{sV}^{eff}=0$

b) $g_n^{eff}=g_n^{free}$.

c) Instead of $Id_{5/2}$, the subshells $2s_{I/2}$ are filled.

d) Instead of $2s_{I/2}$, the neutron subshell $Id_{3/2}$ is filled.

e) Instead of $2s_{I/2}$, the proton subshell $Id_{3/2}$ is filled.

f) Instead of $3s_{I/2}$, the neutron subshell $Ih_{II/2}$ is filled.

g) The level is assumed to be pure single-neutron state (see text).

h) Instead of $3s_{I/2}$, the proton subshell $Ih_{II/2}$ is filled.

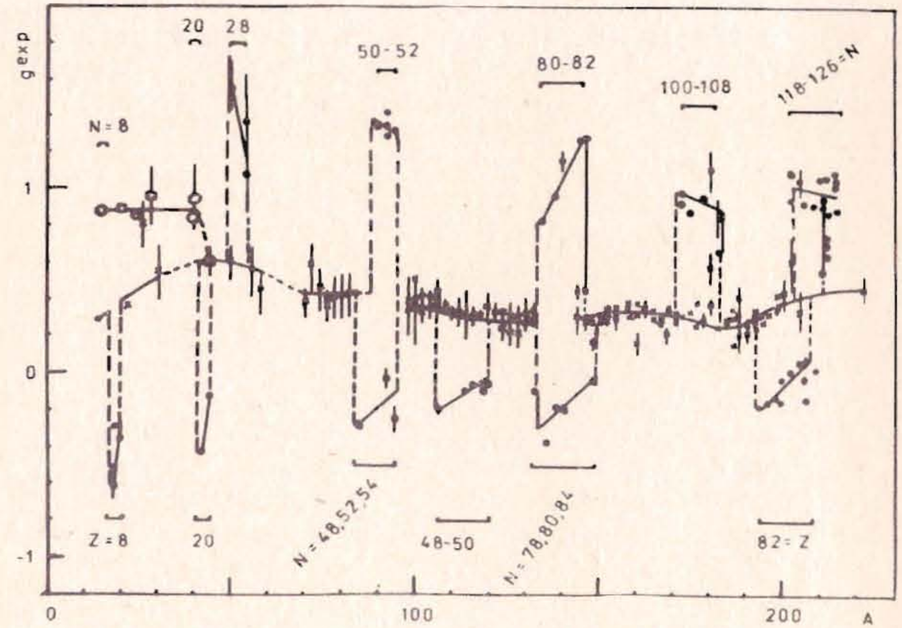

Fig.7. Experimental gyromagnetic ratios of even-even nuclei versus the mass number. The circles, squares, crosses and full circles represent the g-factors of magic Z = N, non-magic Z = N, non-magic Z ≠ N and magic (near-magic) Z ≠ N nuclei, respectively.

Gyromagnetic ratios of the even-even nuclei, except of those with Z = N.

Z	A	E_{lev} (MeV)	J^π	g^{exp}	Sign	g_2^{calc}	g^{exp}/g_2^{calc}	g_3^{calc}	g^{exp}/g_3^{calc}
I	2	3	4	5	6	7	8	9	IO
8	I8	I.962	2^+	-0.287(I5)	{ +			-0.35	0.82(4)
					-			-0.34	0.84(4)
8	I8	3.555	4^+	0.62(IO)	{ +			-0.6I	(+)I.02(I6)
					-			-0.37	(+)I.68(27)
8	20	I.674	2^+	-0.352(I5)	{ +			-0.42	0.84(4)
					-			-0.46	0.76(3)
IO	22	I.275	2^+	+0.36(3)	+	+0.37	0.97(8)		
I2	26	I.809	2^+	+0.80(I5)	+	+0.38[a]	2.I(4)		
I4	30	2.235	2^+	+0.38(9)	+	+0.22[a]	I.7(4)		
20	42	3.I89	6^+	-0.4I5(I5)	+			-0.39	I.06(4)
20	44	I.I57	2^+	-0.I2(4)	{ +			-0.I4	0.86(29)
					-			-0.I3	0.92(3I)
22	50	3.I98	6^+	+I.54(I7)	+			+I.49	I.04(II)
24	50	0.783	2^+	0.6(I)	+	+0.44	I.36(23)		
26	54	I.408	2^+	+I.08(I9)	+			+I.04	I.04(I8)
26	54	2.950	6^+	+I.37(30)	+			+I.6I	0.85(I9)
26	56	0.847	2^+	+0.55(I5)	+	+0.36	I.53(42)		
26	58	0.8II	2^+	+0.36(8)	+	+0.3I	I.I6(26)		
32	70	I.040	2^+	+0.38(8)	+	+0.44	0.86(I8)		
32	72	0.834	2^+	+0.58(I4)	+	+0.45	I.29(3I)		
32	74	0.596	2^+	+0.47(IO)	+	+0.43	I.09(23)		
32	76	0.563	2^+	+0.36(8)	+	+0.4I	0.88(20)		
34	76	0.559	2^+	+0.40(II)	+	+0.43	0.93(26)		
34	78	0.6I4	2^+	+0.4I(II)	+	+0.4I	I.00(27)		
34	80	0.666	2^+	+0.42(I2)	+	+0.39	I.08(3I)		
34	82	0.654	2^+	+0.43(I2)	+	+0.37	I.I6(32)		
36	84	2.956	8^+	-0.243(4)	-			-0.30	0.8I(I)
40	90	3.589	8^+	+I.36(2)	+			+I.29[b]	I.05(2)
40	92	0.934	2^+	-0.03(5)	-			-0.25[b]	
40	94	0.9I9	2^+	-0.26(6)	-			-0.26[b]	I.00(23)
42	92	2.760	8^+	+I.42(2)	+			+I.3I	I.08(2)
42	92	4.484	II^-	+I.285(I2)	+			+I.56	0.82(I)
42	94	2.956	8^+	+I.3I8(I5)	+			+I.28	I.03(I)

Table 6 (continued)

1	2	3	4	5	6	7	8	9	IO
42	94	0.787	2^+	+0.34(I8)	+	+0.35	0.97(5I)		
42	I00	0.535	2^+	+0.34(I8)	+	+0.35	0.97(5I)		
44	94	2.494	6^+	+I.35(I)	+			+I.I6	I.I6(I)
44	98	0.652	2^+	+0.39(I7)	+	+0.37	I.05(46)		
44	I00	0.540	2^+	+0.52(3)	+	+0.37	I.40(8)		
44	I02	0.475	2^+	0.37(3)	+	+0.37	I.00(8)		
44	I04	0.358	2^+	+0.4I(5)	+	+0.35	I.I7(I4)		
46	I00	0.666	2^+	+0.40(4)	+	+0.38	I.05(II)		
46	I02	0.557	2^+	+0.4I(4)	+	+0.38	I.08(I0)		
46	I04	0.556	2^+	+0.35(5)	+	+0.38	0.92(I3)		
46	I06	0.5I2	2^+	+0.374(27)	+	+0.36	I.04(8)		
46	I06	I.I28	2^+	+0.37(I0)	+	+0.36	I.03(27)		
46	I08	0.434	2^+	+0.38(3)	+	+0.34	I.I2(9)		
46	II0	0.374	2^+	+0.35(3)	+	+0.33	I.06(9)		
48	I06	0.633	2^+	+0.40(I0)	+	+0.40	I.00(25)		
48	I06	4.660	$I0^+$	-0.I96(II)	-			-0.I6	I.24(7)
48	I08	0.633	2^+	+0.34(I0)	+	+0.38	0.90(26)		
48	II0	0.658	2^+	+0.32(7)	+	+0.36	0.89(I9)		
48	II2	0.6I7	2^+	+0.33(8)	+	+0.34	0.97(24)		
48	II4	0.558	2^+	+0.32(I3)	+	+0.35	0.9I(37)		
48	II6	0.5I4	2^+	0.35(I2)	+	+0.35	I.00(34)		
50	II4	3.088	7^-	-0.08I(I)	+			-0.030	2.7(I)
50	II6	2.366	5^-	-0.064(I)	+			-0.062	I.03(2)
50	II8	2.32I	5^-	-0.060(5)	+			-0.038	I.58(I3)
50	II8	2.575	7^-	-0.098(I)	+			-0.I2	0.82(I)
50	I20	2.285	5^-	-0.056(5)	+			-0.058	0.97(9)
52	I20	0.560	2^+	+0.35(8)	+	+0.36	0.97(22)		
52	I22	0.564	2^+	+0.34(5)	+	+0.35$^{c)}$	0.97(I4)		
52	I24	0.603	2^+	+0.34(5)	+	+0.30	I.I6(I7)		
52	I26	0.666	2^+	+0.3I(8)	+	+0.29	I.07(28)		
52	I28	0.743	2^+	+0.27(7)	+	+0.28	0.96(25)		
52	I30	0.839	2^+	+0.32(9)	+	+0.28	I.I4(32)		
52	I34	I.69I	6^+	+0.85(3)	+			+0.55	I.54(6)
54	I24	0.354	2^+	+0.24(5)	+	+0.3I	0.77(I6)		
54	I26	0.389	2^+	+0.3I(5)	+	+0.30	I.03(I7)		
54	I28	0.443	2^+	+0.3I(3)	+	+0.29	I.07(I0)		
54	I30	0.536	2^+	+0.3I(4)	+	+0.29	I.07(I4)		
54	I32	0.668	2^+	+0.26(4)	+	+0.26	0.93(I4)		

Table 6 (continued)

1	2	3	4	5	6	7	8	9	IO
54	I32	2.753	$I0^+$	-0.I95(5)	-			-0.I3	I.50(4)
56	I36	2.I40	5^-	-0.37	-			-0.34	I.09
56	I38	2.09I	6^+	+0.98(2)	+			+0.83	I.I8(2)
58	I38	3.538	$(I0)^+$	-0.I76(I0)	-			-0.39	0.45(3)
58	I40	2.084	4^+	+I.I6(8)	+			+I.I9	0.98(7)
60	I40	3.732	$I0^+$	-0.I92(I2)	-			-0.24	0.80(5)
60	I44	0.696	2^+	+0.3I(6)	+	+0.28	I.II(29)		
60	I44	I.3I4	4^+	0.45(5)	+	+0.28	I.6I(I8)		
60	I46	0.454	2^+	+0.29(4)	+	+0.28	I.04(I4)		
60	I48	0.302	2^+	+0.28(3)	+	+0.28	I.00(II)		
60	I50	0.I30	2^+	+0.34(5)	+	+0.28	I.2I(I8)		
60	I50	0.397	2^+	+0.32(5)	+	+0.28	I.I4(I8)		
62	I48	0.550	2^+	+0.I7(5)	+	+0.30	0.57(I7)		
62	I50	0.334	2^+	+0.30(3)	+	+0.30	I.02(I0)		
62	I52	0.I22	2^+	+0.36(3)	+	+0.30	I.20(I0)		
62	I52	0.366	4^+	+0.30(4)	+	+0.30	I.00(I3)		
62	I54	0.082	2^+	+0.3I(6)	+	+0.30	I.03(20)		
62	I54	0.267	4^+	+0.34(4)	+	+0.30	I.I3(I3)		
62	I54	0.547	6^+	+0.32(5)	+	+0.30	I.07(I7)		
64	I44	?	$I0^+$	+I.276(I4)	+			+I.92	0.67(I)
64	I46	?	$I9^+$	+0.44(20)	+	+0.32	I.38(62)	I.68$^{d)}$	
64	I46	?	7^-	+I.283(27)	+			+I.49	0.86(2)
64	I48	?	9^-	-0.028(9)	-			-0.066	0.33(I0)
64	I50	0.638	2^+	+0.30(I0)	+	+0.3I	0.97(32)		
64	I52	0.344	2^+	+0.48(4)	+	+0.3I	I.55(I3)		
64	I54	0.I23	2^+	+0.367(3)	+	+0.3I	I.I8(I)		
64	I56	0.089	2^+	+0.320(3)	+	+0.3I	I.03(I)		
64	I56	0.288	4^+	+0.37(5)	+	+0.3I	I.I9(I6)		
64	I58	0.080	2^+	+0.3I(2)	+	+0.30	I.03(7)		
64	I60	0.075	2^+	+0.3I(3)	+	+0.29	I.07(I0)		
66	I58	0.638	6^+	+0.37	+	+0.3I	I.I9		
66	I60	0.087	2^+	+0.37(I)	+	+0.30	I.23(3)		
66	I60	0.284	4^+	+0.382(5)	+	+0.30	I.27(2)		
66	I60	0.966	2^+	+0.I8(6)	+	+0.30	0.60(20)		
66	I62	0.08I	2^+	+0.343(I4)	+	+0.29	I.I8(5)		
66	I64	0.073	2^+	+0.34(I)	+	+0.28	I.2I(4)		
68	I64	0.09I	2^+	+0.30(I)	+	+0.29	I.03(3)		
68	I66	0.08I	2^+	+0.320(5)	+	+0.28	I.I4(2)		
68	I66	0.256	4^+	+0.275(25)	+	+0.28	0.98(9)		

Table 6 (continued)

1	2	3	4	5	6	7	8	9	I0
68	I66	0.545	6^+	+0.27(2)	+	+0.28	0.96(7)		
68	I68	0.080	2^+	+0.325(6)	+	+0.27	I.20(2)		
68	I68	0.264	4^+	+0.30(4)	+	+0.27	I.II(I5)		
68	I68	I.094	4^-	+0.34(I0)	+	+0.27	I.26(37)		
68	I70	0.079	2^+	+0.3I(I)	+	+0.27	I.I5(4)		
68	I70	0.260	4^+	+0.28(4)	+	+0.27	I.04(I5)		
70	I70	0.084	2^+	+0.336(5)	+	+0.32	I.05(2)		
70	I72	0.079	2^+	+0.334(8)	+	+0.32	I.04(3)		
70	I72	I.I72	3^+	+0.325(2I)	+	+0.32	I.02(7)		
70	I74	0.077	2^+	+0.338(4)	+	+0.32	I.06(I)		
70	I76	0.082	2^+	+0.338(I5)	+	+0.32	I.06(5)		
72	I72	?	8^-	+0.98	+			I.0I	0.97
72	I72	?	6^+	+0.92	+			0.88	I.04
72	I74	?	6^+	+0.892(8)	+			0.89	I.00(I)
72	I76	0.088	2^+	0.27(2)	+	+0.33	0.82(6)		
72	I78	0.093	2^+	+0.30(2)	+	+0.33	0.9I(6)		
72	I78	?	6^+	+0.959(8)	+			0.88	I.09(I)
72	I80	0.093	2^+	0.37(4)	+	+0.3I	I.I9(I3)		
72	I80	0.309	4^+	+0.50(I0)	+			0.75	0.67(I3)
72	I80	I.I42	8^-	+I.I2(II)	+			0.97	I.I6(II)
74	I82	0.I00	2^+	+0.27(2)	+	+0.32	0.84(6)		
74	I82	0.329	4^+	+0.42(7)	+	+0.32	I.3I(22)		
74	I82	I.289	2^-	+0.87(II)	+			0.65	I.34(I7)
74	I82	I.374	3^-	+0.65(I0)	+			0.70	0.93(I4)
74	I84	0.III	2^+	+0.296(9)	+	+0.3I	0.96(3)		
74	I84	0.364	4^+	+0.3I8(25)	+	+0.3I	0.99(8)		
74	I86	0.I23	2^+	+0.3I(I)	+	+0.3I	I.00(3)		
74	I86	0.397	4^+	+0.II5(25)	+	+0.3I	0.37(8)		
74	I88	?	4^+	+0.22(12)	+	+0.3I	0.7I(39)		
76	I86	0.I37	2^+	+0.3I(3)	+	+0.32	0.97(9)		
76	I88	0.I55	2^+	+0.305(I5)	+	+0.32	0.95(5)		
76	I88	0.633	2^+	+0.43(8)	+	+0.32	I.34(25)		
76	I90	0.I87	2^+	+0.340(I5)	+	+0.32	I.06(5)		
76	I90	0.548	4^+	+0.22(I0)	+	+0.32	0.69(3I)		
76	I92	0.205	2^+	+0.30(2)	+	+0.3I	0.97(6)		
76	I92	0.489	2^+	+0.28(I0)	+	+0.3I	0.90(32)		
78	I92	0.3I7	2^+	+0.324(23)	+	+0.32	I.0I(7)		
78	I92	0.6I2	2^+	+0.309(44)	+	+0.32	0.97(I4)		

Table 6 (continued)

1	2	3	4	5	6	7	8	9	I0
78	I92	0.785	4^+	+0.25(I5)	+	+0.32	0.78(47)		
78	I94	0.328	2^+	+0.30(2)	+	+0.32	0.94(6)		
78	I94	0.622	2^+	+0.34(2)	+	+0.32	I.06(6)		
78	I96	0.356	2^+	+0.32(3)	+	+0.3I	I.03(6)		
78	I98	0.407	2^+	+0.36(4)	+	+0.3I	I.I6(I3)		
80	I98	0.4I2	2^+	+0.36(6)	+	+0.32	I.I2(I9)		
80	200	0.368	2^+	+0.37(9)	+	+0.32	I.I6(28)		
80	202	0.440	2^+	+0.55(4)	+	+0.3I	I.77(I3)		
80	204	0.437	2^+	+0.33(9)	+	+0.30	I.I0(30)		
82	I94	≈2.600	$I2^+$	-0.I62(6)	-			-0.I7$^{e)}$	0.95(4)
82	I96	2.700	$I2^+$	-0.I62(8)	-			-0.I4	I.I6(6)
82	I98	≈2.800	$I2^+$	-0.I47(II)	-			-0.I5	0.98(7)
82	200	≈3.I00	$I2^+$	-0.I57(6)	-			-0.I6	0.98(4)
82	200	2.237	9^-	-0.028(I)	-			-0.I8	0.I6(1)
					+			-0.0I5	I.07(7)
82	202	I.383	4^+	+0.002(4)	+			+0.056	
82	204	0.899	2^+	<0.08	+			+0.082	<0.98
82	204	I.274	4^+	+0.056(I)	+			+0.052	I.08(2)
82	206	0.803	2^+	$0.07(^{7}_{4})$	+			+0.078	(+)0.90(5I)
82	206	2.200	7^-	0.036(20)	+			+0.00I5	
					-			-0.22	0.I6(9)
82	206	4.027	$I2^+$	-0.I55(4)	-			-0.I9	0.82(2)
82	206	2.384	6^-	0.I3(7)	-			-0.22	(-)0.59(32)
					+			+0.0I8	
82	208	2.6I5	3^-	0.08(7) 0.64(I0)					
82	208	3.I98	5^-	+0.057(8) -0.02I(7)	+			+0.028	
84	202	I.I(-7)s	8^+	+0.927(9)	+			0.94	0.99(I)
84	202	8.5(-8)s	II^-	+I.08(4)	+			I.II	0.97(4)
84	204	I.650	8^+	+I.04(8)	+			0.93	I.I2(9)
84	206	I.590	8^+	+0.9I9(I3)	+			0.92	I.00(2)
84	208	I.532	8^+	+0.9II(II)	+			0.9I	I.00(I)
84	2I0	I.473	6^+	+0.908(2)	+			0.74	I.23
84	2I0	I.557	8^+	+0.9I4(2)	+			0.90	I.02
84	2I0	2.849	II^-	+I.I02(8)	+			I.06	I.04(I)
84	2I0	4.372	$I3^-$	+0.546(I2)	+	+0.3I	I.76(4)	I.I8	0.46(I)
86	2I2	I.67I	8^+	+0.894(2)	+			0.90	0.99

Table 6 (continued)

1	2	3	4	5	6	7	8	9	IO
86	2I2	4.044	I7$^-$	+I.05(2)	+			I.40	0.75(I)
86	2I2	6.I45	20$^+$	+0.72(I)	+	+0.3I	2.32(3)	I.56	0.46(I)
86	2I2	>7.II3	25$^-$	+0.7I(2)	+	+0.3I	2.29(6)	I.88	0.38(I)
86	2I2	>7.849	27$^-$	0.63(3)	+	+0.3I	2.03(IO)	I.43	0.44(2)
86	2I2	>8.550	30$^+$	0.657(3)	+	+0.3I	2.I2(I)	I.50	0.44
86	222	0.I86	2$^+$	+0.46(7)	+	+0.28	I.6(3)		
88	2I4	I.865	8$^+$	+0.890(4)	+			0.90	0.99(I)
88	2I4	2.68I	II$^-$	+I.08(I)	+			I.06	I.02(I)
88	2I4	3.974	I4$^+$	+I.02(I)	+			I.23	0.83(I)
88	2I4	4.I42	I7$^-$	+I.03(I)	+			I.39	0.74(I)

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[a] If instead of the $2s_{1/2}$ shell, the neutron subshell $1d_{3/2}$ is filled, the calculated g-factor for $^{30}_{14}$Si is $g^{\mathrm{eff}}_{\mathrm{av}} = 0.570$ or $0.75\, g^{\mathrm{eff}}_{\mathrm{av}} = 0.427$. The large uncertainty in g^{exp} does not allow us to conclude unambiguously about this nucleus behaving as one with $N = Z$ or as an ordinary non-magic nucleus. A similar situation is observed in neighbouring $^{26}_{12}$Mg: if the subshell filling is the same, the g-factor has the value $g^{\mathrm{calc}}_2 = g^{\mathrm{eff}}_{\mathrm{av}} = 0.738$ or $g^{\mathrm{calc}}_3 = 0.75\, g^{\mathrm{eff}}_{\mathrm{av}} = 0.555$!

[b] Instead of $2p_{1/2}$, the proton subshell $1g_{9/2}$ is filled.

[c] Instead of $3s_{1/2}$, the neutron subshell $1h_{11/2}$ is filled.

[d] The 19^+ level in $^{146}_{64}$Gd behaves as it belonging to a magic nucleus.

[e] Instead of $3p_{1/2}$, the neutron subshell $1i_{13/2}$ is filled.

Table 7

Gyromagnetic ratios of the odd-odd-nuclei, except of those with $Z = N$.

Table 7 (continued)

Z	A	E^{lev} (MeV)	J^{π}	g^{exp}	Sign	g_l^{p} l, eff	g_l^{n} l, eff	g_3^{calc}	g_4^{calc}	$g^{\mathrm{exp}}/g^{\mathrm{calc}}_{3,4}$
I	2	3	4	5	6	7	8	9	IO	II
3	8	0	2$^+$	+0.826672(I5)	+	I	0		+0.82	I.0I
5	8	0	2$^+$	0.5I78(2)	+	I	0		+0.5I[a])	(+)0.85
5	I2	0	I$^+$	+I.00285(I5)	+	I	0		+I.04[ab])	0.97
7	I2	0	I$^+$	+0.4573([illegible])	+	I	-I		+0.77	0.59
7	I6	0.397	I$^-$	-I.83(I3)	+	I	0		+I.68[ab])	-I.09(8)
9	20	0	2$^+$	+I.0468(5)	+	I	0		+I.08	0.97
II	24	0	4$^+$	+0.4226(2)	+	I	-I		+0.70	0.60
II	26	I.07s	3$^+$	+0.950(I)	+	I	0		+0.92	I.03
II	28	3Ims	I$^+$	+2.425(3)	+	I	-I		+2.48[b])	0.98
II	30	53ms	2$^+$	+I.042(5)	+	I	0		+0.7I	I.47(I)
I3	28	0	3$^+$	+I.08I(2)	+	I	0		+I.I0	0.98
I3	28	0.03I	2$^+$	+2.I4(20)	+	I	0		+2.I6[ab])	0.99(9)
I5	32	0	I$^+$	-0.2524(3)	-	I	0		-0.I9	I.33
I7	36	0	2$^+$	+0.64269(3)	+	I	-I		+0.63	I.02
I7	38	0	2$^+$	+I.02(I)	+	I	0		+I.I9	0.86(I)
I9	36	0	2$^+$	(+)0.2740(5)	-	I	0		-0.37[c])	(+)0.74
I9	40	0	4$^-$	-0.324524(I)	-	I	0		-0.36[c])	0.90
I9	40	0.030	3$^-$	-0.43(3)	-	I	0		-0.37[c])	I.I6(8)
I9	42	0	2$^-$	-0.57I2(3)	-	I	0		-0.38[c])	I.50
2I	44	0	2$^-$	+I.28(2)	+	I	0		+I.I2	I.I4(2)
2I	44	0.068	I$^-$	+0.343(6)	+	I	-I	+0.4I		0.84(2)
2I	44	0.27I	6$^+$	+0.647(2)	+	I	-I		+0.77	0.84
2I	46	0	4$^+$	+0.756(5)	+	I	-I		+0.64	I.I8(I)
23	48	0	4$^+$	0.503(3)	+	I	-I		+0.69	(+)0.73
23	48	0.308	2$^+$	+0.24(I3)	+	I	-I		+0.46	0.52(28)
23	50	0	6$^+$	+0.557908(5)	+	I	-I		+0.57	0.98
25	52	0	6$^+$	+0.5I05(2)	+	I	-I	+0.4I		I.25
					+	I	-I		+0.62	0.82
25	56	0	3$^+$	+I.0755(I)	+	I	0		+I.05	I.02
27	56	0	4$^+$	+0.95I(2)	+	I	0		+I.24	0.77
27	58	0	2$^+$	+2.0I7(4)	+	I	0		+I.97[ab])	I.02
27	58	0.053	4$^+$	+I.048(2)	+	I	0		+I.I6	0.90
27	60	0	5$^+$	+0.760(4)	+	I	0		+I.07	0.7I
27	60	0.059	2$^+$	+2.20(5)	+	I	0		+2.09[ab])	I.05(2)
29	60	0	2$^+$	+0.6I0(2)	+	I	-I		+0.70	0.87
29	62	0	I$^+$	-0.380(4)	-	I	0		-0.49[c])	0.78(I)
29	62	0.04I	2$^+$	+0.66(2)	-	I	0		-0.49[c])	-I.35(4)
29	64	0	I$^+$	-0.2I7(2)	-	I	0		-0.23	0.94(I)
29	66	0	I$^+$	-0.282(2)	-	I	0		-0.22	I.28(I)
3I	66	0.044	I$^+$	-0.504(9)	-	I	0		-0.52[c])	0.97(2)
33	72	0	2$^-$	-I.0780(2)	+	I	0		+I.09	(-)0.99
33	72	0.2I4	3$^+$	+0.527(6)	+	I	-I		+0.65	0.8I(I)
33	74	0.259	(4$^+$)	+0.8I(I)	+	I	-I		+0.70	I.I6(I)

Table 7 (continued)

1	2	3	4	5	6	7	8	9	IO	II
33	76	0	2^-	-0.453(3)	-	I	0		-0.5I[c]	0.89(I)
35	75	0	I^-	(-)0.5479(I)	-	I	0		-0.50[c]	I.IO
35	78	0.032	(2^-)	-0.56(2)	-	I	0		-0.5I[c]	I.IO(3)
35	80	0	I^+	0.5I83(6)	-	I	0		-0.50[c]	(-)I.03
35	80	0.037	2^-	-0.84(6)	-	I	0		-0.52[c]	I.62(I2)
35	80	0.086	5^-	+0.26345(I)	+	I	-I	+0.26		I.0I
35	82	0	5^-	+0.32528(I)	+	I	-I	+0.38		0.86
37	78	6.0m	4	+0.64(I)	+	I	-I		+0.66	0.94(2)
37	80	0	I^+	-0.0834(3)	-	I	0		-0.50[c]	0.I7
37	82	0.280	5^-	+0.3287(2)	+	I	-I	+0.39		0.84
37	84	0	2^-	-0.5623(8)	-	I	0		-0.62[c]	I.07
37	86	0	2^-	-0.8468(8)	+	I	0		+I.0I	0.84
37	88	0	2^-	+0.2558(I3)	+	I	-I	+0.35		0.73
39	86	0.243	2^-	-0.53(3)	-	I	0		-0.52[c]	I.02(6)
39	86	0.575	8^+	+0.598(I2)	+	I	-I		+0.74	0.8I(2)
39	90	0	2^-	-0.8I5(4)	-	I	0		-0.52[c]	I.56(I)
					-	I	0		-0.79[cd]	I.03(I)
39	90	0.203	3^-	-0.284(23)	-	I	0		-0.30	0.95(8)
4I	90	0	6^+	0.620I(4)	+	I	-I		+0.68	(+)0.9I
4I	90	0.I22	6^+	+0.620(4)	+	I	-I		+0.63	0.98(I)
43	94	0	7^+	0.725(I)	+	I	-I		+0.64	(+)I.I3
43	96	0	7^+	0.767(24)	+	I	-I		+0.64	(+)I.20(4)
43	96	0.II9	4^-	0.233(IO)	-	I	0		-0.33	(-)0.7I(3)
45	I00	0.075	2^+	+2.I4I(I5)	+	I	0		+I.72[ab]	I.24(I)
47	I04	0	5^+	0.80(4)	+	I	-I		+0.63	(+)I.27(6)
47	I04	0.020	2^+	+I.8(I)	+	I	0		+I.74[ab]	I.03(6)
47	I06	0.088	6^+	0.6I8(25)	+	I	-I		+0.72	(+)0.86(4)
47	I08	0	I^+	+2.6728	+	I	0		+I.75[ab]	I.53
					+	I	-I		+3.29[b]	0.8I
47	I08	0.II0	6^+	+0.60I(I)	+	I	-I		+0.69	0.87
47	I08	0.2I5	2	+I.30I(II)	+	I	0		+I.05	I.24(I)
47	II0	0	I^+	+2.7III(IO)	+	I	0		+I.74[ab]	I.56
					+	I	-I		+3.28[b]	0.83
47	II0	0.II9	3^+	+I.242(I2)	+	I	0		+I.06	I.I7(I)
47	II0	0.II8	6^+	+0.60I(I)	+	I	-I		+0.58	I.04
49	II0	0	2^+	+2.I82(2)	+	I	0		+I.76[ab]	I.24
49	II0	5h	7^+	0.74(4)	+	I	-I		+I.25	(+) 0.59(3)
49	II0	0.I2I	7	I.5	+	I	-I		+I.25	(+)I.20

Table 7 (continued)

1	2	3	4	5	6	7	8	9	IO	II
49	II2	0	I^+	+2.8I(3)	+	I	0		+I.74[ab]	I.6I(I)
					+	I	-I		+3.29[b]	0.85(I)
49	II2	0.606	8	+0.385(4)	+	I	-I	+0.36		I.07(I)
49	II4	0	I^+	+I.7(4)	+	I	0		+I.6I[ab]	I.06(25)
49	II4	0.I90	5^+	+0.94(2)	+	I	0		+I.IO	0.85(2)
49	II6	0	I^+	2.7859(I2)	+	I	-I		+2.92[b]	(+)0.95
					+	I	0		+I.52[ab]	(+)I.72
49	II6	0.I27	5^+	+0.844(I6)	+	I	0		+I.02	0.83(2)
5I	II4	0.496	8	+0.283(I)	+	I	-I	+0.36		0.79
5I	II8		I^+	2.47(7)	+	I	0		+I.50[ab]	(+)I.65(5)
					+	I	-I		+2.94[b]	(+)0.84(2)
5I	II8	0.05I	3^+	+0.88(2)	+	I	0		+I.03	0.85(2)
5I	II8	5.0h	8^-	0.290(5)	+	I	-I	+0.36		(+)0.8I(I)
5I	I20	0	I^+	2.34(22)	+	I	-I		+2.90[b]	(+)0.8I(8)
5I	I20	5.8d	8^-	0.292(I)	+	I	-I	+0.34		(+)0.86
5I	I22	0	2^-	-0.95(I)	-	I	0		-0.54[c]	I.76(2)
					+	I	0		-0.92[e]	I.03(I)
5I	I22	0.06I	3^+	+0.994(4)	+	I	0		+0.94	I.06(I)
5I	I24	0	3^-	0.40(I)	+	I	-I		+0.44	(+)0.9I(2)
53	I32	0	4^+	0.774(2)	+	I	0		+0.90	(+)0.86
55	I24	0	I^+	+0.674(7)	+	I	-I		+I.IO[ab]	0.5I(I)
55	I26	0	I^+	+0.779(8)	+	I	-I		+I.08[ab]	0.72(I)
55	I28	0	I^+	+0.977(IO)	+	I	-I		+I.08[ab]	0.90(I)
55	I30	0	I^+	+I.460(7)	+	I	0		+I.57[ab]	0.93
55	I32	0	$2^{(-)}$	+I.III(3)	+	I	0		+0.90	I.23
55	I34	0	4^+	+0.7484(2)	+	I	0		+0.92	0.8I
55	I34	0.0II	5^+	+0.664(I2)	+	I	0		+0.94	0.7I(I)
55	I36	0	5^+	+0.742(I)	+	I	0		+0.92	0.8I
57	I38	0	5^+	+0.73697(2)	+	I	0		+0.83	0.89
57	I40	0	3^-	+0.243(5)	+	I	-I	+0.26		0.94(2)
59	I44	0.080	I^-	-I.2(4)	+	I	0		-0.92[a]	I.30(44)
					+	I	0		+I.57[ab]	-0.76(25)
6I	I48	0	I^-	+2.08(2I)	+	I	0		+I.57[ab]	I.32(I3)
6I	I48	0.I37	6^-	0.30(3)	+	I	-I	+0.29		(+) I.03(IO)
63	I52	0	3^-	+0.647I(4)	+	I	0		+0.95	0.68
63	I54	0	3^-	0.668(2)	+	I	0		+0.95	(+)0.70
65	I56	0	3^-	0.63(IO)	+	I	0		+0.97	(+)0.65(IO)
65	I58	0	3^-	+0.586(2)	+	I	-I		+0.47	I.25

Table 7 (continued)

1	2	3	4	5	6	7	8	9	IO	II
65	I60	0	3^-	+0.567(3)	+	I	-I		+0.46	I.23(I)
67	I66	0.005	(7^-)	0.5I4(7)	+	I	-I		+0.55	(+)0.93(I)
7I	I7I	0	4^-	0.56(2)	+	I	-I		+0.49	(+)I.I4(4)
7I	I76	0	7^-	+0.455(2)	+	I	-I		+0.56	0.8I
7I	I76	0.I27	I^-	+0.3I8(3)	+	I	-I	+0.32		0.99(I)
73	I82	0	3^-	0.99(2)	+	I	0		+I.00	(+)0.99(2)
75	I82	0	7^+	0.399(8)	+	I	-I	+0.33		(+)I.2I(2)
75	I84	0	3^-	(+)0.633(I7)	+	I	0		+I.02	0.82(2)
75	I84	0.I86	8^+	(+)0.358(I6)	+	I	-I	+0.32		I.I2(5)
75	I86	0	I^-	+I.739(3)	+	I	0		+I.59[ab]	I.09
75	I88	0	I^-	+I.768(5)	+	I	0		+I.6I[ab]	I.II
77	I92	0	$4^{(-)}$	0.48I(3)	+	I	-I		+0.49	(+)0.98(I)
77	I94	0	I^-	0.37(4)	+	I	-I	+0.3I		(+)I.I9(I3)
79	I96	0	2^-	+0.2957(7)	+	I	-I	+0.32		0.92
79	I96	0.595	$I2^-$	0.45(2)	+	I	-I		+0.64	(+)0.70(3)
79	I98	0	2^-	+0.2967(2)	+	I	-I	+0.3I		0.96
79	I98	0.6I2	$I2^-$	0.46(3)	{ +	I	-I	+0.3I		(+)I.48(I0)
					+	I	-I		+0.62	(+)0.74(5)
79	200	≈I.000	$I2^-$	0.5I(2)	+	I	-I		+0.62	(+)0.82(3)
83	202	≈0.598	$I0^-$	0.255(3)	+	I	-I	+0.32		(+)0.80(I)
83	204	0	6^+	+0.7I(I)	{ +	I	-I		+0.52	I.36(2)
					+	I	0		+I.02	0.70(I)
83	206	0	6^+	0.76(I)	+	I	0		+I.0I	(+)0.75(I)
83	208	I.57I	$(I0)^-$	0.2666(27)	+	I	-I	+0.3I		(+)0.86
83	2I0	0.439	$(5)^-$	0.306(9)	+	I	-I	+0.30		(+)I.02(3)
85	2I2	0.888	II^+	0.54I(II)	+	I	-I		+0.6I	(+)0.89(2)
85	2I2	I.543	$I5^-$	0.622(I0)	+	I	-I		+0.69	(+)0.90(2)
95	242	0	I^-	+0.373(7)	+	I	-I	+0.2I		I.77(3)

a) $g_n^{eff}=g_n^{free}$

b) $g_p^{eff}=g_p^{free}$

c) $g_{av}^{eff}=0$

d) g_p^{eff} is equal to the gyromagnetic ratio of the proton in the $2p_{I/2}$ state.

e) It is accepted that one of the neutrons in the $2s_{I/2}$ subshell moves up to the $Ih_{II/2}$ subshell.

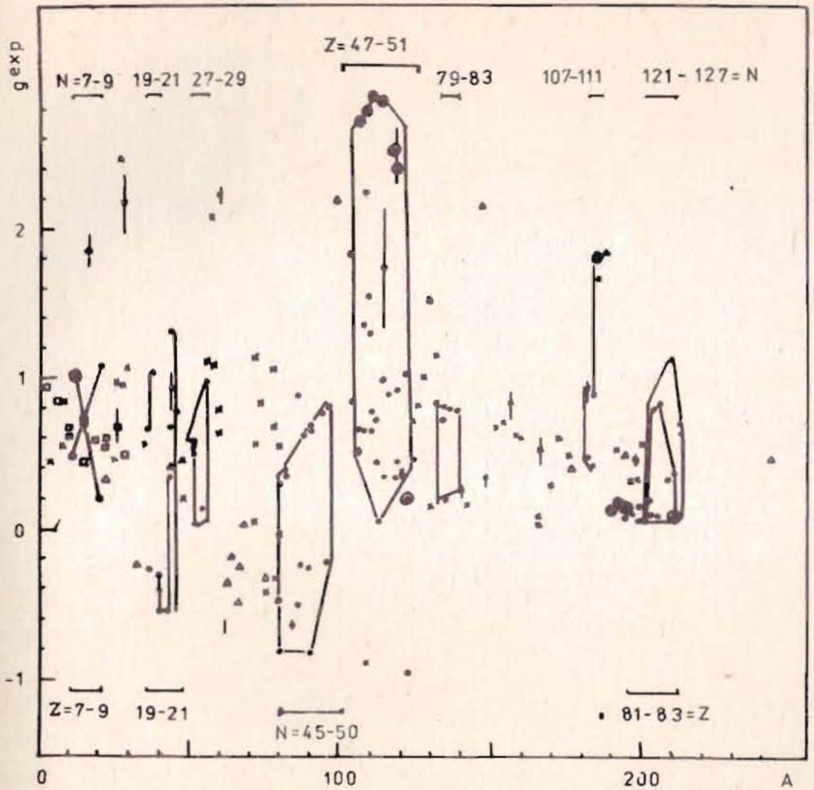

Fig.8. Experimental gyromagnetic ratios of odd-odd nuclei versus the mass number. The squares, crosses, triangles, triangles in circles and full circles represent the g*-factors of the* Z = N*, non-magic* J ≠ 1*, non-magic* J = 1*, near-magic* J = 1 *and near-magic* J ≠ 1 *nuclei, respectively.*

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Гиромагнитные отношения и модифицированная формула Шмидта

Систематизированы гиромагнитные отношения четных и нечетных по массовому числу ядер в области A = 2-243. На основе наблюдаемых закономерностей предлагается метод расчета гиромагнитных отношений в виде эмпирической модифицированной формулы Шмидта. Расчетные значения согласуются с экспериментом в пределах меньших, чем 30%.

Работа выполнена в Лаборатории ядерных проблем ОИЯИ.

Препринт Объединенного института ядерных исследований. Дубна 1984

Avotina M.P., Kracíková T.I. E6-84-527
Gyromagnetic Ratios and Modified Schmidt Formula

Experimental gyromagnetic ratios of even- and odd-A nuclei have been systematically examined in the mass region of A = 2-243. On the basis of the observed regularities, a method is proposed in a form of the modified Schmidt formula for the calculation of the gyromagnetic ratios. The calculated values of the g-factors agree with the experimental ones within 30%.

The investigation has been performed at the Laboratory of Nuclear Problems, JINR.

Preprint of the Joint Institute for Nuclear Research. Dubna 1984