

The Decay of Tb<sup>160</sup> and H<sup>160</sup> and the Level Scheme of Dy<sup>160</sup> 48 10 10 10 10

of the  $\gamma$ -lines in the spectrum of photoelectrons are in the range of  $\pm 20\%$  in agreement with those of references 5 and 6. The measurements of the conversion spectrum show that the soft component is twice as weak as the hard one. The multiplicity of these transitions apparently is equal and between the intensities of the  $\gamma$ -lines the same relation must exist. - Radioactive Ho<sup>160</sup> was obtained by irradiation of a tantalum target with protons with an energy of 4.5 to 6.60 MeV. The erbium and holmium fractions were chromatographically separated from the target. In the conversion spectrum all conversion lines of Ho<sup>160</sup> that had been obtained in reference 8 were also confirmed here and many new ones discovered. It is shown that the transitions to the upper levels are permitted ones. The small number of positrons (one positron) per decay is explained by the fact that at the low decay-energy the K-capture is dominating. When the decay to two upper levels is considered permitted  $K/\beta^+$  can be determined according to the tables by Zweife (ref. 10). The values 5400 and 400 thus obtained are very high, consequently a considerable part of all conversions of Ho<sup>160</sup> must take place by way of K-capture. In the

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second short chapter the determination of the multiplicity of transitions is shown and its results are given in the form of a table. - In the third chapter the scheme of the  $Dy^{160}$ -levels is treated. A level scheme of  $Dy^{160}$  was here compiled with the use of all experimental data, theoretical considerations and the analogy with the neighboring nuclei. This scheme in the best manner corresponds to all data. All arguments confirming this scheme are given here and all facts contradicting this scheme or facts which cannot be explained are enumerated. There are 8 figures, 12 tables, and 19 references. 8 of which are Soviet.

ASSOCIATION: Fizicheskiy institut Leningradskogo gosudarstvennogo universiteta im. A. A. Zhdanova (Institute for Physics in the Leningrad State University imeni A. A. Zhdanov)

AVAILABLE: Library of Congress

Card 3/3 1. Terbium-Decay 2. Terbium isotopes (Radioactive)

PEKER, L. K.

49-22-2-16/17

AUTHOR: Peker, L. K.

TITLE: On the Decay Schemes of Some Odd-Odd Deformed Nuclei (O skhemakh raspada nekotorykh nechetno-nechetnykh deformirovannykh yader)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 2, pp. 216 - 227 (USSR)

ABSTRACT: In this paper it was attempted to construct the level schemes of some odd-odd nuclei on the basis of the existing experimental data on the  $\beta$ - and  $\gamma$ -spectra and to coordinate them with the respective theoretical conceptions. In the chapter: The level scheme of  $^{154}_{64}\text{Gd}$  the decay scheme according to Stephens is referred to which is considered to be too complicated. Simplifications of this scheme are proposed here. Proceeding from this example it is stated here that the values  $K = 0^-$  and  $K = 2^+$  can be chosen if at least the multipolar order of one of the four  $\gamma$ -lines: 1005.4; 996.6; 873.7 and 757.36 keV is known, because in the case of  $K = 0^-$  they are all of type E 1, or, if  $K = 2^+$  they refer to the type E 2. The paper contains a table with the theoretical and experi-

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## On the Decay Schemes of Some Odd-Odd Deformed Nuclei

mental data on the ratios, which are combined to an intensity energy of the transitions. In the chapters:

The level scheme of  ${}_{64}^{156}\text{Gd}_{92}$  it is referred to the respective data in "New Nuclear Data" (1957) which, however, are considered to be incomplete. Therefore in this paper the construction of a scheme on the basis of the theoretical conceptions on the properties of the levels of the deformed odd-odd nuclei is proposed. In the chapter:

The level scheme of  ${}_{68}^{168}\text{Er}_{100}$  reference is made to the data on the  $\gamma$ -decay spectrum of  $\text{Ta}^{168}$  (Ref 17) and it is stated here with respect to  $\text{Er}^{168}$  that in this case  $\gamma$  lines are absent, which may be interpreted as  $\gamma$ -transitions from the high level of the type  $2^+$  or  $1$ . Therefore the assumption is made here that such a level is missing up to the excitation energy and therefore the vibration level  $2^+$  in  $\text{Er}^{168}$  must be somewhat higher. In the chapter:

The level scheme of  ${}_{74}^{184}\text{W}_{110}$  it is stated that the excitation of these levels takes place in the  $\beta$ -decay of  ${}_{73}^{184}\text{Ta}_{110}^{\pm}$

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and in the  $\epsilon$ -decay of  $^{75}\text{Re}^{184}$ . For the purpose of a clearer determination of these levels here data are given on the  $\gamma$ -lines of  $\text{Ta}^{184}$  and the  $\gamma$ -spectrum of  $\text{Re}^{184}$  and it is stated that  $\text{W}^{134}_{2^+}$  must have the energy of  $\approx 110$  keV, and that the second rotation level  $4^+$  must have the energy 360 keV and that "apparently" the  $\gamma$ -line 240 keV must correspond to the transition  $4^+ \rightarrow 2^+$ . For the determination of other  $\gamma$ -lines the levels: 1000, 1190, 1295, 1455 and 1500 keV are introduced. In the chapter:

The level scheme of  $^{74}\text{W}^{186}_{112}$  the analogy with  $\text{Cs}^{186}$  with the same number of neutrons is used, and the supposition is made that in  $\text{W}^{186}$  the level 730 keV exists, which is connected by the transitions 730 and 610 keV with the levels  $0^+$  and  $2^+$  ( $K=0^+$ ). For a clear determination of the remaining lines the levels 930, 1030 and 1440 keV are used. The position of the line 1150 keV is here considered to be not clear. In the

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chapter: The level scheme of  ${}_{92}\text{U}^{232}$  these levels are traced back to the  $\beta$ -decay of  $\text{Pa}^{232}$ , the  $\epsilon$ -decay of  $\text{Np}^{232}$  and the  $\alpha$ -decay of  $\text{Pu}^{236}$ . The construction of the scheme for  $\text{U}^{232}$  is analogous to that of  $\text{Th}^{228}$  (Ref 4) and  $\text{Pu}^{238}$  (Ref 1). The  $\gamma$ -lines 389 and 455 keV correspond to the rotation levels ( $K=0^-$ ): 436 ( $1^-$ ) and 502 keV ( $3^-$ ). The levels 868 and 943 keV (if they exist) can be related to  $K=0$ . The values of  $K/L$  for the lines 868 and 821 keV are not contradictory to the multipole order  $E 2$ . In the chapter:

The level scheme of  ${}_{94}\text{Pu}^{240}$  these levels are put into relation with the  $\alpha$ -decay of  $\text{Cm}^{244}$ . It is here assumed that the level of  $\text{Pu}^{240}$  of 600 keV represents the vibration level with  $\nu=0$ . The  $\beta$ -decay of the isomeric state of  $\text{Np}^{240}$  is accompanied by  $\gamma$ -lines 1400, 900 and 560 keV and the  $\epsilon$ -decay in  $\text{Am}^{240}$  by 1400, 1020, 920, 98.9 and 42,97 (Refs 26, 27). In order to place these lines correctly the analogy with

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$\text{Pu}^{240}$  was used together with the assumption that a vibration level  $0^+$  940 keV and the levels 1020, 1060 keV (band with  $K=2^+$ ) with spins  $2^+$  and  $3^+$  exist. As a conclusion, tables of results and their explanation are given. There are 8 figures, 5 tables, and 29 references, 7 of which are Soviet.

ASSOCIATION: Biblioteka AN SSSR  
(Library AS USSR)

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1. Nuclei (Deformation)-Beta spectra  
Gamma spectra
2. Nuclei (Deformation)-

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PEKER

48-22-2-17/17

**AUTHOR:** Peker, L. K.

**TITLE:** On the Peculiarities of Nuclei With Small Deformation Parameters. The Properties of  ${}_{76}^{190}\text{Os}_{114}$  (Ob osobennostyakh yader s malymi parametrami deformatsii. Svoystva  ${}_{76}^{190}\text{Os}_{114}$ )

**PERIODICAL:** Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1958, Vol. 22, Nr 2, pp. 228 -234 (USSR)

**ABSTRAAT:** In this paper the properties of the nucleus which is on the other end of the same range of deformed nuclei of  ${}_{76}^{190}\text{Os}_{114}$ , are dealt with. The scheme was based on the following considerations: In the  $\gamma$ -spectrum accompanying the decay (10 minutes) of  $\text{Os}^{190}$  four lines of the type E2 with 614, 500, 359 and 187 keV were determined, which together give congruences (References 3, 4), the line 39 keV of the type M2 (Ref 5) was established besides. The sequence of the spins:  $0^+$ ,  $2^+$ ,  $4^+$ ,  $6^+$ ,  $8^+$  and the clearly pronounced regularity in the continuous energy increase of the  $\gamma$ -transitions permitted to assume

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On the Peculiarities of Nuclei With Small Deformation Parameters. The Properties of  ${}_{76}^{190}\text{Os}_{114}$

that a rotation band  $0(0^+)$ ,  $186(2^+)$ ,  $585(4^+)$ ,  $1046(6^+)$ ,  $1660$  keV ( $8^+$ ) exists in  $\text{Os}^{190}$  and that the transition 39 keV represents an isomeric transition of type M 2 from the level 1669 keV ( $10^-$ ) to 1660 keV ( $8^+$ ). In the  $\gamma$ -spectrum of  $\text{Re}^{190}$  only the line 186 keV was observed out of the mentioned five lines of the rotation band and in the  $\gamma$ -spectrum of  $\text{Ir}^{190}$  (11 days) the lines 186 and 360 keV were observed, a number of other lines, however, was found: In  $\text{Re}^{190}$ : 830( $\sim 25$ ), 569( $\sim 75$ ), 392( $\sim 75$ ) and 191 keV ( $\sim 75$ ), and in  $\text{Ir}^{190}$ :  $\sim 1330(\sim 2)$ ,  $\sim 800(17)$ , 580(80), 540(65), 400(55), 360(30) and 186 keV (75) (the brackets giving the transition intensities). As, up to now no attempt has been made in investigations to place those lines in the scheme of  $\text{Os}^{190}$ , such an attempt was made in the present paper. The final conclusions give the following statements: All data obtained here speak in favor of the fact that many conceptions on nuclei with small deformation parameters of the type  $\text{Os}^{190}$  can not be confirmed on the basis of the theory of deformed nuclei. Thus, K in  $\text{Os}^{190}$  practically ceases to be a "good" quantum number, because

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On the Peculiarities of Nuclei With Small Deformation Parameters. The Properties of  ${}_{76}^{190}\text{Os}_{114}$

almost no prohibition occurs. The deviation of  $B_1/B_2$  from the value 0,7 (after Alaga and others, Ref 12) speaks in favor of the fact that no possibility exists in  $\text{Os}^{190}$  to separate the rotation motion from the internal motion to a comparatively satisfactory degree. There are 1 figure, 1 table, and 22 references, 6 of which are Soviet.

ASSOCIATION: Biblioteka AN SSSR (Library, AS USSR)

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1. Osmium-Properties analysis

Card 3/3

USCOMM-DC-55,049





PEKER, L K

21 (7), 21 (8)  
AUTHOR:

Rudakov, V. P.

TITLE:

IX All-Union Conference on Nuclear Spectroscopy  
(IX Vsesoyuznoye sveshchaniye po yadernoy spektroskopii)

PERIODICAL:

Atomnaya energiya. 1959. Vol 7, Nr . . .

ABSTRACT:

The IX All-Union Conference was held from January 26 to February 2, 1959 at Khar'kov. More than 300 participants heard 100 lectures, the most important of which dealt with the following fields. Nuclear Theory. General problems of  $\beta$ -decay. A. S. Darydov (IGU): Theoretical classification of low-energy excited nuclear states. L. K. Peker: Deformed nuclei. L. L. Birbrair, L. K. Peker, L. A. Sliv (LFTI): Quadrupole oscillations of deformed nuclei. Ye. V. Iropin, V. N. Genchar, S. P. Tsytko (KMFPI): Calculation of the ft-values with matrix elements for  $\beta$ -transitions by means of the generalized nuclear model. S. T. Belyayev (IAE): Consideration of pair-correlation in nuclei. A. E. Migdal (IAE): The application of the superconductivity model to nuclei for the purpose of calculating their moments of inertia. P. E. Nandrovskiy (IAE): Problems of the neutron stability of nuclei. Ya. A. Smoredinskiy (IAE): The present stage in the theory of  $\beta$ -decay. V. V. Vladimirovskiy.

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## IX. All-Union Conference on Nuclear Spectroscopy

207/89-7-1-18/26

V. K. Grigor'yov, V. A. Yergakov, Yu. V. Trebukhovskiy (ITEF): Measurement of the angular correlation between electron and neutrino in the decay of the neutron. V. M. Lebashev, V. A. Nazarenko, L. I. Rusinov (LFTI): Measurement of the correlation between the transversal electron polarization and circular polarization of  $\gamma$ -quanta occurring in the decay of  $Sc^{46}$  and  $Co^{60}$ . Decay Schemes.  $\gamma$ -radiation of Nuclei. Yu. P. Anufriyev, A. K. Val'ter, Yu. V. Gonchar, Ye. G. Kopaneyts, A. N. L'vov, P. M. Tutakin, S. P. Taytko, P. V. Serokin, A. S. Deyneko, I. Ya. Malakhov, A. Ya. Taranov (Fiziko-tekhnichesk'iy Khar'kovskiy institut (Physico-technical Institute, Khar'kov)): The  $Si^{28,29,30}(p,\gamma)$ ,  $He^{20}(p,\gamma)$ ,  $S^{32,34}(p,\gamma)$ ,  $Ar^{40}(p,\gamma)$  and  $N^{14}(p,\gamma)$  reactions. D. G. Alkhazov, A. P. Grinberg, G. K. Gushinskiy, M. Kh. Lemberg, V. V. Rozhdestvenskiy, E. N. Yerokhina of the Leningradskiy fiziko-tekhnichesk'iy institut (Leningrad Physico-technical Institute): Investigation of the Coulomb excitation of the lower levels of some nuclei during their bombardment by multiply charged ions (C, N, O, and Ne). A. V. Kalyamin, A. N. Murin, V. N. Pokrovskiy, V. A. Yakovlev (RIAN): New isotopes

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## IX. All-Union Conference on Nuclear Spectroscopy

SOV/89-7-1-13/26

Tu<sup>161</sup>, Ho<sup>153</sup>, Ho<sup>155</sup> and Ho<sup>157</sup>. B. S. Dzheleпов, V. A. Sergiyenko (LGU): Decay schemes of some neutron-deficient isotopes, set up on the basis of measurements of the coincidence of the internal conversion electrons. Spectroscopy Engineering. B. S. Dzheleпов, R. B. Ivanov, V. G. Nedovesov, V. G. Chumin (RIAN):  $\alpha$ -spectrometer with double focusing. S. A. Baranov, V. V. Beruchko, A. G. Zelenkov, A. F. Malov, G. Ya. Shchepkin (IAE): Improved  $\alpha$ -spectrometer. I. F. Barchuk, G. V. Belykh, V. I. Golyshkin, V. A. Novtun (IFAN UkrSSR): Magnetic spectrograph for heavy charged particles. The representatives of the Ministerstvo radiotekhnicheskoy promyshlennosti (Ministry of the Radio-engineering industry) gave a report about new multipliers. The Conference was closed by B. S. Dzheleпов, who stressed the fact that nuclear tables and reference works ought to be published much more quickly in order to be of real use to the experimenter.

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B006/B014

24.6520

AUTHOR: Peker, L. K.

TITLE: Rotational Levels of Deformed Odd-odd Nuclei

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,  
Vol. 24, No. 3, pp. 365-368

TEXT: The article under review was read at the Tenth All-Union Conference on Nuclear Spectroscopy (Moscow, January 19 - 27, 1960). According to data of publications, rotational levels have hitherto been found only for one odd-odd nucleus, namely,  $71Lu^{176}$ . Here, the author shows that on the strength of theoretical considerations rotational levels may also occur in other odd-odd nuclei. The formula

$$E_I = \frac{A^2}{2J} [I(I+1) - I_0(I_0+1)]$$

was used to calculate the energies of rotational levels occurring in such nuclei. As the spin of the ground state  $I_0$  is known in most cases, it is only necessary for energy

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Rotational Levels of Deformed Odd-odd  
Nuclei

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calculations to estimate the moment of inertia of the odd-odd nucleus. This is done in the following way: In nuclei with odd A the odd nucleon (p or n) makes a great contribution  $\delta J$  (50 - 70 per cent) to the moment of inertia.  $\delta J$  is considerably dependent on the quantum state in which the nucleon is.  $\delta J$  is equal to the difference between the moments of inertia of the odd nucleus  $J_{\text{odd}}$  and of the neighboring even-even nucleus

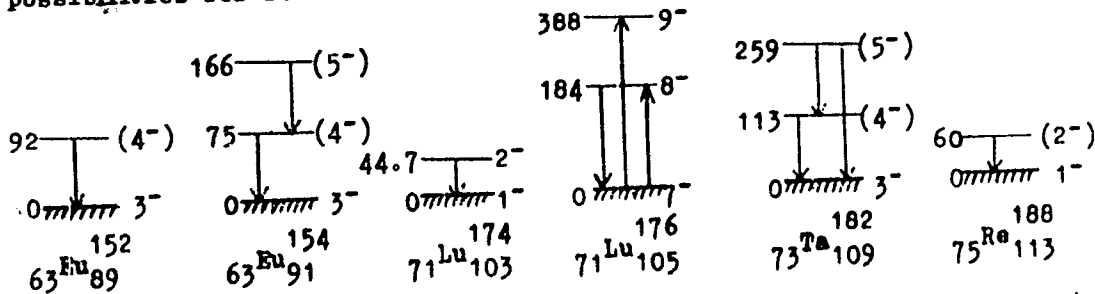
$J_{e-e} : \delta J_{p \text{ or } n} = J_{\text{odd}} - J_{e-e}$ . By way of approximation the following ansatz is possible:  $J_{\text{odd-odd}} = J_{e-e} + \delta J_p + \delta J_n$ . The three right-hand terms are calculated from the rotational levels of the neighboring even-even and odd nuclei. A table lists experimental values of  $\delta J_p$  and  $\delta J_n$  for some nuclei, the energy values of the first rotational level ( $E_1$ ) calculated by means of the last-mentioned values, as well as the  $E_2/E_1$  ratio.  $E_2$  is the energy of the second rotational level. It is rather difficult to compare the calculated values of  $E_1$  and  $E_2$ .  $E_1$  and  $E_2$  have been exactly determined for  ${}_{71}\text{Lu}_{106}$  by the method of Coulomb excitation. The Table shows that these experimental data are in close

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Rotational Levels of Deformed Odd-odd Nuclei

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agreement with calculated values. Conditions are more complicated concerning other nuclei. It may be assumed, for instance, that the  $2^-$  levels of  $^{174}_{71}\text{Lu}$  and  $^{188}_{75}\text{Re}$  having energies of 44.7 and  $\sim 60$  keV are rotational levels. Another possibility of identifying rotational levels is offered by an analysis of the gamma spectra accompanying  $(n,\gamma)$  reactions on nuclei with odd Z. The author discusses the following possibilities for rotational levels in odd-odd nuclei:



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S/048/60/024/03/17/517  
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24.6520

AUTHOR: Peker, L. K.

TITLE: Interpretation of High Excited Levels of  $W^{182}$

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 3, pp. 369-371

TEXT: The article under review was read at the Tenth All-Union Conference on Nuclear Spectroscopy (Moscow, January 19 - 27, 1960). High excited levels of various even-even nuclei experimentally studied in recent years are now to be interpreted theoretically on the basis of the generalized nuclear model. The present paper makes a contribution to this problem. For the case of  $W^{182}$  the author investigates the problem of rotational levels. Assuming that the high levels (excitation energies  $> 1$  Mev) are not too closely spaced so that their interaction may be regarded as a perturbation, the interaction of levels with equal  $I$  and  $\Delta K = \pm 2$  results in an energy shift

$$\Delta E_1 = A_1 [I(I+1) - I_0(I_0+1)] - B_1 [I(I+1) - I_0(I_0+1)]^2$$

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Interpretation of High Excited Levels  
of W182

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perturbation-theoretical approximation. For  $\Delta K = \pm 1$  the same formula is obtained, however,  $B_2$  may be positive or negative;  
 $\Delta E_2 = A_2 [I(I+1) - I_0(I_0+1)] \pm B_2 [I(I+1) - I_0(I_0+1)]^2$ . Thus, one obtains  
 $\Delta E = \Delta E_1 + \Delta E_2 = A [I(I+1) - I_0(I_0+1)] - B [I(I+1) - I_0(I_0+1)]^2$ , and the formula for rotational energy reads  $E_I = A_0 [I(I+1) - I_0(I_0+1)] + \Delta E$ , or  
 $E_I = A [I(I+1) - I_0(I_0+1)] - B [I(I+1) - I_0(I_0+1)]^2$ . The structure of this formula corresponds exactly to that of the ordinary formula for relatively pure rotational levels in the range of lower levels. On the strength of these considerations on the formula obtained for  $E$  it is possible to analyze the range of upper in the level scheme of W182 by using empirical data. The band with  $K = 2^-$  of which six terms are known is the most interesting in this respect. Levels having the spins  $2^-$ ,  $3^-$ ,  $5^-$ , and  $7^-$  may be well described by the rotational energy formula with  $A = 14.2$  kev and  $B = 0.016$  kev. The levels having  $6^-$  in the rotational bands with  $K = 2^-$  and  $K = 4^-$  ought to have the same energy of about 176.1 kev in accordance with the formula; i.e., they are closely spaced

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B006/B014

24.6510  
AUTHORS:

Peker, L. K., Varshalovich, D. A.

TITLE:

Magnetic Moments of Deformed Nuclei With K = 1/2

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,  
Vol. 24, No. 3, pp. 372-376

TEXT: The article under review was read at the Tenth All-Union Conference of Nuclear Spectroscopy (Moscow, January 19 - 27, 1960). Deformed nuclei in the state K = 1/2 exhibit a number of peculiar features. They have an anomalous rotational band, characterized by the parameters  $3A^2/J$  and  $a$ . The magnetic moments and the M1-transition probabilities between rotational levels with K = 1/2 are not only functions of the gyromagnetic ratios of the single-particle and collective motion  $g_K$  and  $g_R$ , but also of the parameter  $b$ . It holds that

$$\mu(I) = \frac{1}{4(I+1)} (g_K - g_R) [1 - (2I+1)(-1)^{I-1/2} b] + Ig_K \quad \text{and}$$

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Magnetic Moments of Deformed Nuclei  
With  $K = 1/2$

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$$B(M1, I+1 \rightarrow I) = \frac{3}{64\pi} \left( \frac{e\hbar}{2Mc} \right)^2 \frac{2I+1}{I+1} (g_K - g_R)^2 [1 + b(-1)^{I-1/2}]^2 .$$

The nuclear

magnetic moment in the ground state of the band  $I = K - \Omega = 1/2$  reads for

$$K = \frac{1}{2}^+ : 3\mu_0 = g_K + g_R(1-a) - g_1(1-a) + g_s/2 \quad - (3), \text{ and for}$$

$$K = \frac{1}{2}^- : 3\mu_0 = g_R(1-a) + g_1(1-a) - g_s/2 \quad - (4),$$

where  $g_s$  and  $g_1$  denote the spin- and orbital gyromagnetic ratio of the unpaired proton or neutron. It may be assumed that  $g_s = 5.58$  (proton) and  $-3.82$  (neutron),  $g_1 = 1$  (proton),  $g_1 = 0$  (neutron). The values of  $g_s$  and  $g_1$  may deviate considerably in the nucleus from those given here for free nucleons. The authors show that such a renormalization of the gyromagnetic ratios  $g_s$  and  $g_1$  is necessary to explain the experimental  $\mu_0$  values of the nuclei  $\text{Yb}^{171}$  and  $\text{W}^{183}$ . For  $\text{Tu}^{169}$ , as already shown in Ref. 4, relation (3) is satisfied with non-renormalized  $g_s$  and  $g_1$  and  $g_R = Z/A$ . All hitherto known rotational band nuclei with  $K = 1/2$  ( $\text{Tu}^{169}$ ,  $\text{Yb}^{171}$ ,  $\text{W}^{183}$ , and  $\text{Pu}^{239}$ )

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Magnetic Moments of Deformed Nuclei  
With  $K = 1/2$

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B006/B014

are investigated again. For a first example  $Tu^{169}$ ; it is found that also when making use of new and complete data, no renormalization of  $g_8$  and  $g_1$  is necessary. The same holds for  $Pu^{239}$ ,  $Yb^{171}$  and  $W^{183}$  have rotational bands with  $K = \frac{1}{2}$ . Here,  $g_R$  may be obtained from (4) only if

renormalized  $g_8$  and  $g_1$  are used. One obtains  $g_R = -4.0$  and not  $+0.40$  as would result from  $Z/A$ . The fact that (4) is not satisfied might be caused by the change in the parameter  $a$  due to a shift of the rotational bands  $K = 1/2$  and  $K = 3/2$ . This change of  $a$ , however, is not so great as to explain the experimental  $\mu_0$  value without renormalization of  $g_8$  and

$g_1$ . Much the same holds for conditions with  $W^{183}$ . While  $g_R = +0.28$  is obtained experimentally, (4) yields  $g_R = -1.9$ . It is therefore necessary for these two nuclei to renormalize the  $g_8$  and  $g_1$  of the nucleons. Values of these parameters, with which (4) is satisfied, are given. An appendix offers experimental data concerning these four nuclei. D. F. Zaretskiy and A. V. Shut'ko are mentioned in a footnote. There are 13 references, 4

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Magnetic Moments of Deformed Nuclei  
With  $K = 1/2$

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3 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut  
Leningradskogo gos. universiteta im. A. A. Zhdanova  
(Scientific Research Institute of Physics of Leningrad  
State University imeni A. A. Zhdanov)

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24.6720

AUTHORS:

Dneprovskiy, I. S., Nemet, L., Peker, L. K.

TITLE:

The Decay of  $Er^{161}$  19

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,  
Vol. 39, No. 1(7), pp. 13-15

TEXT: After a short introductory discussion of the results obtained by other authors when investigating the transition energies of  $Er^{161}$ , the authors of the present paper give a report on their own results. For the purpose of explaining the nature of the transition  $h\nu = 826$  kev of  $Er^{161}$ , they bombarded tantalum with 660-Mev protons from the synchro-cyclotron of the Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) and investigated the radiation accompanying the erbium decay by means of a scintillation spectrometer and a double focusing  $\beta$ -spectrometer. The half life of this transition was measured as amounting to  $(190 \pm 10)$  min, the energy determination gave a value of  $(826.5 \pm 1.5)$  kev. For the purpose of determining the conversion coefficient

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The Decay of Er<sup>161</sup>S/056/60/039/001/031/041/XX  
B006/B056

of this transition, the electron conversion line ratio and the ratio of the photopeaks of the gamma spectrum of this transition and of the 661.6-keV transition of the Ba<sup>137</sup> nucleus had to be measured. In this connection it was necessary to take the radiations of the two isotopes Er<sup>160</sup> and Er<sup>158</sup>, which also existed in the preparation, into account; the greatest correction was furnished by the gamma transitions 848 and 851 keV of the Ho<sup>158</sup>-decay. In an earlier paper, these transitions had already been investigated and had been identified as E2-transitions between the second and the first rotational band. The intensity ratio  $I_{\gamma 826} / I_{\gamma 848, 851}$

was determined as amounting to  $4.0 \pm 0.2$ . If all corrections are taken into account,  $\alpha_{\gamma} = 0.008 \pm 0.002$  was obtained for the K-conversion coefficient of the 826-keV transition. According to the tables by L. A. Sliv and N. I. Band, this gamma transition is of the type M1 or E3. In order to arrive at a decision, the intensity ratio of the conversion lines K/L was measured and a value  $7.0 \pm 0.8$  was obtained, which excludes the E3-type. The intensity ratio of the gamma transitions 211 and 826 keV was measured as

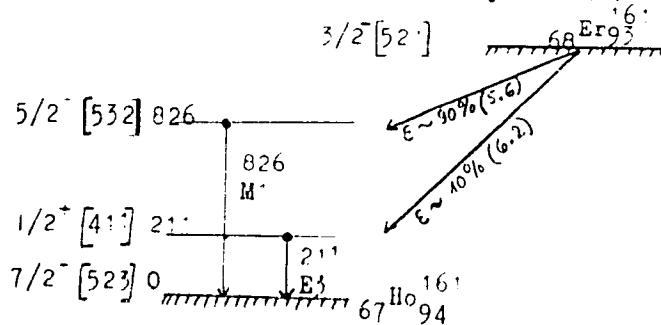
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The Decay of Er<sup>161</sup>

S/056/60/039/001/031/041/XX  
B006/BC56

amounting to  $I_{\gamma 826} / I_{\gamma 211} = 8.0 \pm 1.5$ . All results obtained by measurements are represented in the following decay scheme:



The authors finally thank I. A. Yutlandov and S. Khaynatskiy for carrying out the chemical work. There are 1 figure and 9 references: 4 Soviet and 5 US.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences, USSR)

Card 3/4

PEKER, L.K. X

Decay schemes of radioactive nuclei, by B.S. Dzhelelov and L.K. Peker. New York, London, Pergamon Press, 1961.

786 p. diags.

Translated from the original Russian: Skhemy raspada radioaktivnykh yader, Moscow, 1958.

Includes references.

S/048/61/025/002/014/016  
B117/B212

AUTHORS: Varshalovich, D. A., Peker, L. K.

TITLE: Peculiarities of deformed odd-odd nuclei with  $K = 0$

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25,  
no. 2, 1961, 287-295

TEXT: The present paper was read at the 11th Annual Conference on Nuclear Spectroscopy (Riga, January 25 to February 2, 1961). Preliminary results of the work, concerning peculiarities of  $\text{Am}^{242}$ ,  $\text{Ta}^{180*}$ , and  $\text{Lu}^{176*}$  have been reported on at the 10th All-Union Conference on Nuclear Spectroscopy (Moscow, 1960). The paper mainly deals with the properties of rotational levels of odd-odd nuclei. It is pointed out that all conclusions also pertain to excited states of even-even nuclei with non-paired nucleons. It was shown that the inner wave functions describing the levels of a certain rotational band will differ from that of levels with one even and one odd spin  $I$ , despite the equal states of odd neutrons and protons. It follows therefrom that these rotational levels with even and odd spins are shifted with respect to each other. Due to the dependence of  $E_0$  on  $I$  it is shown that

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with  $B < A$  the level with  $I = 0$  is the lowest level of the band with  $K = 0$ . For the case of  $A < B$ , if the rotational level is of the type  $I = 1, K = 0$  must be below  $I = 0$  (Fig. 1b). This was studied on odd-odd nuclei the spin of which was  $I = 1$  (according to experimental (direct or indirect) data (Refs. 2 and 3) (Table 1). For cases examined, the  $I$ -,  $L$ -, and  $K$ -values were known. For the initial state with  $I = 1$ , two possible values  $K = 0$  and  $K = 1$  must be considered, since the relations of the beta-transition probabilities mentioned are very sensitive to an exchange of  $K = 0$  for  $K = 1$ . Therefore, the  $K$ -value of an odd-odd nucleus may definitely be determined by relatively rough measurements of the intensities of both beta transitions. The absolute values may be predicted, and the signs of the quadrupole moments  $Q$ , and the magnetic dipole moments  $\mu$  of these states can be determined for nuclei for which the condition  $A < B$  is fulfilled. If the ground state or the isomeric state has  $I = 1$  but  $K = 0$ . The multipole gamma-transition probability  $L$  between the rotational level of bands having the spin  $I_1$  and  $I_2$ , and  $K = 0$  can be represented by

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$$B(L) = [\langle \chi_{\alpha}^d(p) \chi_{\alpha}^{\beta}(n) | \hat{W} | \chi_{\alpha}^d(p) \chi_{\alpha}^{\beta}(n) \rangle \cdot (1 + (-)^{\Delta I + L})]^2 \langle I_1, L00 | J_1, L I_2 0 \rangle^2 \quad (12).$$

For gamma transitions between levels with even (or odd) spins  $\Delta I = I_2 - I_1 = 2$ , the above formula assumes the form

$$B(E2) = \frac{5}{16\pi} e^2 Q_0^2 \langle I_1, L00 | I_1, L I_2 0 \rangle^2, \text{ for rotational levels of even-even nuclei}$$

(Ref. 1). For transitions between the rotational levels  $I + 1$  and  $I$ , it reads  $B(E2; I + 1 \rightarrow I) = 0$ . These transitions, however, must be pure  $M_1$ -dipole transitions. The results obtained hold not only for transitions between the levels of two different rotational bands with  $K = 0$  but also for transitions between the levels of two different rotational bands with  $K = 0_{\pm}$ . If the odd proton and neutron of a light nucleus are in the same quantum state ( $\chi_{\alpha p}^d = \chi_{\alpha n}^{\beta}$ ), the bands with  $K = 0$  show additional peculiarities ✓

In this case, isotopic spin formalism may be applied. Actually, there are two such functions in this case: 1) The coordinate-spin part is antisymmetric, the isotopic-spin part is symmetric; 2) Vice versa. The first wave

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function corresponds to  $I = 1^+, 3^+, 5^+ \dots$  and is characterized by the isotopic spin  $T = 0$ . The second wave function corresponds to the group of levels with an even spin  $I = 0^+, 2^+, 4^+ \dots$  and is characterized by  $T = 1$ . Fig. 3 shows experimental data for some excited states of  ${}_{11}\text{Na}_{11}^{22}$  (Refs. 26 and 27), and  ${}_{13}\text{Al}_{13}^{26}$  (Ref. 26), which can be explained as rotational levels and follow these conclusions. The peculiarities mentioned for rotational bands with  $K = 0$  in odd-odd nuclei are caused by the fact that in these nuclei odd nucleons are in different quantum states. A similar situation is observed in even-even nuclei, if during excitation the linkage of one of the neutron-proton pairs is disrupted. Like in the case of odd-odd nuclei, the rotational bands corresponding to such a state of even-even nuclei must contain groups of levels with even and odd spins which are shifted with respect to each other. This peculiarity of "single-body" levels for even-even nuclei with  $K = 0$  distinguishes them from the collective states for  $K = 0$ . In Refs. 29 and 30, similar results are given. There are 3 figures, 2 tables, and 30 references: 8 Soviet-bloc.

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Peculiarities of deformed ...

S/048/61/025/002/014/016  
B117/B212

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova (Scientific Research Institute of Physics of the Leningrad State University imeni A. A. Zhdanov)  
Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences USSR)

Legend to Table 1: 1) parent and daughter nuclei; 2) type of the transition; 3) experimental values; 4) theoretical values.

Таблица 1  
β-распад нечетно-нечетных ядер с I=1 на уровни дочерних ядер I=0+ и 2+ [3, 4]

Исходное и дочернее ядра 1	Тип перехода 2	lg f <sub>исп</sub> 3	A* <sub>исп</sub> 3	A <sub>теор.</sub> K=1 4	A <sub>теор.</sub> K=0 4
${}_{87}^{164}\text{Ho} \xrightarrow{\beta^-} {}_{88}^{164}\text{Er}$	1+ → 0+ 1+ → 2+	6,4 6,7	+0,3	+0,3	-0,3
${}_{89}^{170}\text{Tm} \xrightarrow{\beta^-} {}_{90}^{170}\text{Yb}$	1- → 0+ 1- → 2+	8,9 9,3	+0,4	+0,3	-0,3

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S/048/61/025/002/015/016  
B117/B212

AUTHORS: Voykhanskiy, M. Ye. and Peker, L. K.

TITLE: Selection rules for beta and gamma transitions on odd-odd nuclei

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 2, 1961, 297-308

TEXT: The present paper was read at the 11th Annual Conference on Nuclear Spectroscopy (Riga, January 25 to February 2, 1961). It deals with the asymptotic selection rules and their significance for beta and gamma transitions. The authors have shown that transitions in such nuclei exhibit a number of peculiarities, as compared to transitions in nuclei with an odd A. The beta and gamma transitions in odd-odd nuclei may be divided into two groups (Ref. 9). Transitions between states of the same binding scheme

$\Omega_i = \Omega_{1i} \pm \Omega_{2i} \rightarrow \Omega_f = \Omega_{1f} \pm \Omega_{2f}$  are called transitions of the first class. Transitions between states of a different binding scheme

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Selection rules for ...

S/048/61/025/002/015/C16  
B117/B212

$\Omega_i = \Omega_{1i} \pm \Omega_{2i} \rightarrow \Omega_f = \Omega_{1f} \pm \Omega_{2f}$  are called transitions of the second class by the authors. Experimental data on the beta-transition probability ( $\log ft$ ) in odd-odd nuclei are given in Table 2 for deformed nuclei, and in Table 3 for spherical nuclei. These data are divided into groups according to the transition classes and the order of forbiddenness. They show that beta transitions of the second class are, as a rule, marked by larger  $\log ft$  values. In both classes those transitions are strictly separated which, according to  $\Delta$  ( $j$  or  $l$ ), are allowed or forbidden. At present, an analysis of gamma transitions in even-even nuclei is practically an analysis of isomeric transitions of  $L \geq 2$ . Table 4 gives experimental data for isomeric transitions of the second class in deformed nuclei. In

${}_{11}^{22}\text{Na}_{11}$ ,  ${}_{11}^{24}\text{Na}_{13}$ ,  ${}_{65}^{158}\text{Tb}_{93}$ ,  ${}_{71}^{174}\text{Lu}_{103}$ , and  ${}_{95}^{242}\text{Am}_{147}$ , these transitions connect both interlinks of a doublet. With the exception of gamma transitions in  ${}_{11}^{22}\text{Na}_{11}$  and  ${}_{11}^{24}\text{Na}_{13}$ , where there is no forbiddenness, all the other transitions are greatly delayed. This delay may be influenced by the  $\Delta$  forbiddenness should be found for gamma transitions of the second class, with re-

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spect to  $j$  or  $l$ . It is illustrated by data on transition probabilities of the M4-type. In this case, transitions are only forbidden if the binding scheme changes. The established data point to a strong influence of the  $\Delta$  ( $j$  or  $l$ ) selection rules for beta and gamma transitions in nuclei with even  $A$ . It is therefore possible to apply for the transition characteristic of odd-odd and even-even, deformed and spherical nuclei not only  $I, K, \Omega(I, j)$  but also the quantum numbers  $\Delta(j$  or  $l)$ . This conclusion agrees with information in Ref. 8 where it was shown that the introduction of asymptotic quantum numbers  $\Delta, \Sigma$  is of significance for the classification of the moments of state of odd-odd nuclei. The authors thank M. A. Listengarten for discussing the paper. There are 5 tables and 21 references: 8 Soviet-bloc.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gos. universiteta im. A. A. Zhdanova (Scientific Research Institute of Physics, Leningrad State University imeni A. A. Zhdanov)  
Leningradskiy khimiko-farmatsevticheskiy institut (Leningrad Chemicopharmaceutical Institute)

Card. 3/10

24.6200

22291  
S/053/61/073/004/004/007  
B125/B201

AUTHORS: Gol'danskiy, V. I., Peker, L. K.

TITLE: Some problems of the isomerism of atomic nuclei

PERIODICAL: Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 631-653

TEXT: The authors wanted to complete the following synoptic articles by the detailed discussion of some special problems of nuclear isomerism: M. I. Korsunskiy "Isomerism of atomic nuclei" (1954), a survey by L. I. Rusinov and G. M. Drabkin in the January 1958 issue of Uspekhi fizicheskikh nauk; an article by L. I. Rusinov (deceased), Uspekhi fizicheskikh nauk, v. 73, no. 4, 1961, 615-630 on the story of the discovery of the isomerism of atomic nuclei and on the outstanding contribution by I. V. Kurchatov to the study of this phenomenon. The first part of the present paper deals with isomeric transitions near the millisecond range ( $10^{-5}$  - 1 sec). Until late in 1955, no more than 10 isomeric transitions were known in this range. According to O. I. Leypunskiy, this lack was due to insufficient research work in the field of the excitation of

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such levels by strong pulsed accelerators. According to formulas by Weisskopf and S. A. Moshkovskiy for single-particle transitions, such with  $T_{1/2} = 10^{-5}$  to 1 sec and with an energy between 100 and 500 keV must be predominantly octupole transitions (of the type E3 and M3) or magnetic quadrupole transitions (of the type M2). One of the main achievements attained with the single-particle shell model was the explanation of "isomerism islets". According to the generalized shell model, isomeric transitions of an arbitrary type are possible in deformed nuclei. The single-particle shell model is only an approximation model and cannot precisely describe the energy of single-particle levels. O. I. Leypunskiy, A. M. Morozov, Yu. V. Makarov, P. A. Yampol'skiy (ZhETF 32, 393 (1957)) discovered in the Tl arising from the irradiation of Hg by fast protons two shortlived activities with  $T_{1/2} = 0.042$  sec ( $E_{\gamma} = 370$  keV) and  $T_{1/2} = 5 \cdot 10^{-3}$  sec. Because of the great variety of the material concerned, only a few conclusions can be indicated in the abstract for a summary: When allowing for the regrouping of single-particle levels in the G6ppert-Mayer scheme, it will be practically possible to explain all "anomalous" isomeric states

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and transitions of the types E3 and M2, by taking account of the configuration levels. The levels with the spins  $I_0 + 1$  and  $I_0 + 2$  are most probably collective levels forming a rotational band related to the ground state. There are already many signs pointing to the necessity of undertaking a simultaneous study of the collective and the single-particle properties of nuclear levels. Isomeric states in odd-odd nuclei: (a) General characteristic properties: levels with small and large spin values (corresponding to addition or subtraction of  $j_p$  and  $j_n$ ) are found more frequently with odd-odd nuclei than with odd nuclei. It is therefore most probable that one or several levels with widely varying spin values appear near the ground state. Even though the multiplet configuration may be known (values of  $j_p$  and  $j_n$ ), the spin of the isomeric and also of the ground state of an odd-odd nucleus is still difficult to be explained. Fig. 7 shows the intervals  $\Delta E$  (kev) between the single-particle levels  $7+2-(i_{13/2} - f_{5/2})$  in odd-odd nuclei of  $81\text{Tl}$  and in odd nuclei of  $80\text{Hg}$  and  $82\text{Pb}$  as a function of the number of neutrons. 1 - filled shells. Excited levels are easy to interpret in deformed odd-odd nuclei. In fact, there

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can be only one odd nucleon on a level with any value of  $\Omega = \Lambda \pm \Sigma$ , and the total angular momentum of the odd group of nucleons coincides with the angular momentum  $\Omega_{p(n)}$  of this nucleon. In the presence of a deformation the multiplet is always reduced to a doublet, whose elements have the spins  $I = K = |\Omega_p \pm \Omega_n|$ . Galakher and Moskovskiy have suggested the following semiempirical rule: The level with  $K = |\Omega_p + \Omega_n|$  is the lower level of the abovementioned doublet if the projections of the spin moments  $\Sigma_p$  and  $\Sigma_n$  are equal. In the opposite case, the level with  $K = |\Omega_p - \Omega_n|$  is the level ground state. Most of the experimental data confirm this rule. Isomeric configuration levels and the possibilities of their configuration by multicharged ions. The table shows the possible values of the total momenta for the configuration levels  $(j)^k$ . In the transitions between the configuration levels it is necessary that an E2 or M1 radiation be emitted (or also conversion electrons). The cross sections of the excitation of configuration levels by multicharged ions are finally discussed. The configuration levels may appear with inelastic scattering, e.g.:

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$^{18}\text{Ar}^{40}(0) + ^{36}\text{Kr}^{83}(9/2+) \rightarrow ^{18}\text{Ar}^{40*}(6+) + ^{36}\text{Kr}^{83*}(21/2+)$ , and sometimes also in neutron transfer processes of the type

$^{36}\text{Kr}^{83}(9/2+) + ^{38}\text{Sr}^{87}(9/2+) \rightarrow ^{36}\text{Kr}^{84*}(8+) + ^{38}\text{Sr}^{86*}(8+)$ . The exponential function of neutron exchange has been calculated similarly to Ye. M. Lifshits. The excitation cross section of a nucleus with N neutrons and Z protons reads

$$\sigma_{\text{exc}}(N, Z) \approx \sigma_{\text{nepr}}(N-1, Z) \exp \left\{ -2(R-\varrho) \kappa(N, Z) - 2R \frac{I(N, Z) - I^*(N, Z)}{h\nu_0} \operatorname{arctg} \frac{I(N, Z) - I^*(N, Z)}{h\nu_0 [\kappa(N, Z) + \kappa^*(N, Z)]} + 2R \frac{I(N-1, Z) - I(N, Z)}{h\nu_0} \operatorname{arctg} \frac{I(N-1, Z) - I(N, Z)}{h\nu_0 [\kappa(N-1, Z) + \kappa(N, Z)]} \right\}. \quad (5)$$

X

The dissertation of candidate A. M. Morozov (Institut khimicheskoy fiziki AN SSSR - Moskovskiy inzhenerno-fizicheskiy institut, 1961. g.) (Institute of Chemical Physics of the AS USSR - Moscow Institute of Physics and

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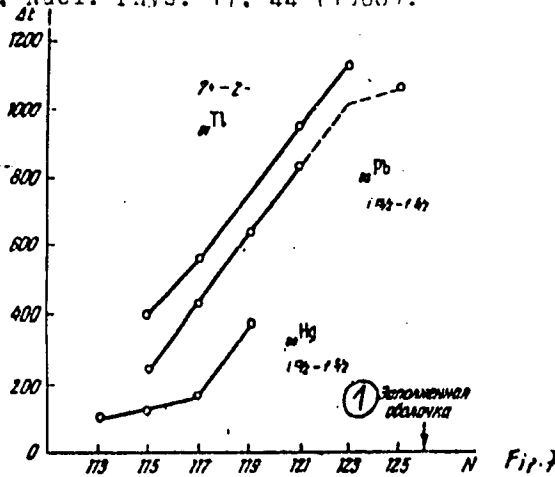
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Some problems of the isomerism of...

Engineering, 1961) contains a complete list of the elements bombarded by 19.2-Mev protons. There are 7 figures, 1 table, and 52 references: 23 Soviet-bloc and 29 non-Soviet-bloc. The two most recent references to English-language publications read as follows: A. Zucker, Phys. Rev. Lett. 4, 21, 1960; J. Pinajian, Nucl. Phys. 17, 44 (1960).

Legend to Fig. 7:  
1, filled shell.



Card 6/8

S/048/62/026/001/014/018  
B125/B104

AUTHORS: Rzhazanka, I., Frana, Ya., Adam, I., and Peker, L.

TITLE: The rotational nature of the isomeric level of  $^{176}_{71}\text{Lu}^{105}$   
( $T_{1/2} = 3.7$  hrs)

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26,  
no. 1, 1962, 127 - 130

TEXT: For the isomer  $^{176}_{71}\text{Lu}^{105}$  with  $I = 1$  it follows from its decay scheme that  $K = 0$ , which proves that the isomeric ionization level of  $^{176}_{71}\text{Lu}^{105}$  is the rotational level with  $I = 1$  and  $K = 0$ , and that the ground state of the band with  $I = 0^-$  is higher. The oxide of the isomer  $^{176}_{71}\text{Lu}^{105}$  obtained by bombarding spectroscopically pure  $\text{Lu}_2\text{O}_3$  with thermal neutrons ( $10^{13}$  neutrons  $\text{cm}^{-2}\text{sec}^{-1}$ ) was converted to its chloride. The  $\beta^-$ -spectrum of  $^{176}_{71}\text{Lu}^{105}$ , which was irradiated in a reactor for 20 hrs, was measured with a resolution of 2%. The electrons were recorded by an anthracene scintillation counter. This was done with particular care in the  
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$$\langle I_1 L K_1 K_{1z} - K_1 | I_1 K_1 I_1 K_{1z} \rangle^2$$

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where  $K_{f1}$  and  $K_{f2}$  denote the values of  $K$  for the two final states. For  $K_i = 0$  one finds  $(ft)_{2^+} / (ft)_{0^+} = 0.5$ , and for  $K_i = 1$  one has  $(ft)_{2^+} / (ft)_{0^+} = 1$ .

From the energies and intensities of the two beta transitions obtained here, it finally follows that  $(ft)_{2^+} / (ft)_{0^+} \sim 0.56$ . The isomeric level of

$^{176}_{71}\text{Lu}_{105}$  with  $I = 1$  thus has the value  $K = 0$ , and L. K. Peker's hypothesis

(Doklad na X soveshchanii po yadernoy spektroskopii (Report at the 10th Congress on Nuclear Spectroscopy), Moscow, January 1960, on the rotational nature of this isomeric level is confirmed. Zd. Playner from the Institute of Nuclear Research of the Czechoslovakian AS is thanked for making possible measurements with a double-focusing spectrometer. There are 2 figures and 14 references: 4 Soviet-bloc and 10 non-Soviet-bloc. The four most recent references to English-language publications read as follows: White M. B., Alpert S. S., Lipworth E., Bull. Amer. Phys. Soc., 5, 273 (1960); Harmatz B., Handley T. H., Mihelich J. W., Phys. Rev., 119, 1345 (1960); Chupp E. L., Dumond J. W. M., Gordon F. J., Jopson R. C., Mark H., Bull. Amer. Phys

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The rotational nature of...

S/048/62/026/001/014,018  
B125/B104

Soc., 2, 55 (1958); Rose M. E., Internal Conversion Coefficients Amsterdam, 1958.

ASSOCIATION: Institute of Nuclear Research of the Czechoslovakian AS. ✓  
Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo  
gos. universiteta im. A. A. Zhdanov (Scientific Research  
Institute of Physics of the Leningrad State University im.  
A. A. Zhdanov)

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L 07154-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP7001029

SOURCE CODE: UR/0048/66/030/001/0144/0147

AUTHOR: Peker, L. K. and Kharitonov, Yu. I.

ORG: [Peker] Leningrad State University (Leningradskiy gosudarstvennyy universitet);  
[Kharitonov] Physicotechnical institute im. A. F. Ioffe AN SSSR (Fiziko-tekhnicheskiy  
 institut AN SSSR)

TITLE: Three-particle isomeric states with small spin<sup>19</sup> [Paper presented at the 2nd  
 All-Union Symposium on the Physics of Thin Ferromagnetic Films; Irkutsk, 10-15 July  
 1964]

Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya (Bulletin of the Academy  
 of Sciences USSR: Physics Series), Vol 30, No 1, Jan 1966, pp 144-147

Abstract: Silvola et al. (J. Nucl. Phys., Vol 52, p. 449 1964) showed the  
 existence of a long-lived alpha-radioactive isomeric state in  $^{201}_{83}\text{Bi}$   
 with small spin. Due to the similarity in decay characteristics of  $\text{Bi}^{201}$   
 to  $\text{Bi}^{195-203}$  one may suppose that the latter also have small spin. Experi-  
 mentally it was observed that the ground states of  $\text{Bi}^{199-209}$  are  $9/2$ , and  
 no spin of  $1/2$  exists for the lowest single-particle proton levels. Con-  
 sequently, the observed isomeric levels with spin  $1/2$  must be from multiple-  
 particle states. The energy of the level indicates that not more than 3  
 particles are involved, and it is improbable that all are nucleons and/or  
 protons. Considerations involved in the problem are discussed in detail.  
 The authors thank L. A. Sliv for useful discussions. Orig. art. has: 4 figures, 2  
 formulas and 1 table. [JPRS: 35,435]

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0924 003.



L 07154-67

ACC NR: AP7001029

TOPIC TAGS: <sup>27</sup>bismuth, radioactive decay, isomer, alpha radiation

SUB CODE: 18 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 003

Card 2/2 *mrc*

L 09231-67 EWT(m)/EWP(t)/ETI IJP(c) JD/JG  
ACC NR: AP7002798

SOURCE CODE: UR/0048/66/030/008/1330/1333

AUTHOR: Balodis, M. K; Peker, L. K; Prokof'yev, P. T. 28

ORG: All-Union Scientific Research Institute of Metrology im. D. I. Mendeleev  
(Vsesoyuznyy nauchno-issledovatel'skiy institut metrologii); Institute of Physics,  
AN LatSSR (Institut fiziki AN LatSSR)

TITLE: Collective gyromagnetic ratio  $g$  sub R of odd-odd nuclei. <sup>19</sup> Magnetic and  
electrical properties of sub 69 Tu sup 170 sub 101

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 8, 1966, 1330-1333

TOPIC TAGS: nucleon, thulium 27

ABSTRACT: It is shown that, owing to random circumstances, the gyromagnetic ratios  $g_R$  and  $g_K$ , conditioned by the collective movement of the nucleus and movement of unpaired nucleons, can also be determined for the configuration  $\rho^{1/2} + \theta i \sigma; n^{1/2} - [S 2 \bar{1}]$ , corresponding to the fundamental state of  ${}^{60}\text{Tu}^{170}_{101}$  with  $I^\pi = K^\pi = 1^-$ . In this case,  $g_R \approx 0.247 \approx g_K$ . It is further shown that from the experimental findings on the electric quadrupole moment  $Q$  ( $Q + 0.574 \pm 0.009$  barn) and relative intensities of  $\gamma_{114}$  and  $\gamma_{75}$  for  $\text{Tu}^{170}$  it is possible to estimate the effect of the cross-over matrix element of the operator of  $Q$ , which is found to be relatively small but sufficient to reduce the electric quadrupole moment  $Q$  by 10-20%. Orig. art. has: 1 figure, 10 formulas and 1 table. [JPRS: 39,040]

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 003 / OTH REF: 014

Card 1/1 mlc

0925 1686

L 28956-66 EWT(m)

ACC NR: AP6019089

SOURCE CODE: UR/0367/66/003/001/0032/0033

AUTHOR: Pekar, I. K.

22  
B

ORG: Leningrad State University (Leningradskiy gosudarstvennyy universitet)

TITLE: Five-particle isomer state in sub 54 Xe sup 125

SOURCE: Yadernaya fizika, v. 3, no. 1, 1966, 32-33

TOPIC TAGS: nuclear isomer, xenon, nucleon

ABSTRACT: It is shown that a recent discovered, many-particle isomer state in Xe<sup>125</sup> cannot be a three-particle state but is more complicated. It is suggested that this is the first example of "five-particle" isomer states, in which the spin is due to five unpaired nucleons. Based on author's Eng. abstract. The author is grateful to A.G. Demin for interesting discussions. Orig. art. has: 3 formulae. /JPRS/

SUB CODE: 20 / SUBM DATE: 15May65 / ORIG REF: 002 / OTH REF: 001

Card 1/1 BLC

FEER, L.K.; KHARITONOV, Yu.I.

Three-particle isomeric states with a small spin. Izv. AN SSSR.  
Ser.fiz. 30 no.1:144-147 Ja '66.

(MIRA 19:1)

1. Fiziko-tekhnicheskiy institut im. A.F.Ioffe AN SSSR;  
Leningradskiy gosudarstvennyy universitet.

GUSEV, Nikolay Grigor'yevich; MASHKOVICH, Vadim Pavlovich;  
VERBITSKIY, Boris Viktorovich; PEKER, L.K., nauchr. red.;  
KALYUZHAYAYA, T.P., red.

[Radioisotopes as gamma emitters] Radioaktivnye izotopy kak  
gamma-izluchateli. Moskva, Atomizdat, 1964. 277 p.  
(IRA 17:7)

ACCESSION NR: AP4024054

S/0048/64/028/002/0295/0297

AUTHOR: Peker, L.K.

TITLE: On rotational bands associated with two-particle states of deformed even-even nuclei [Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14 to 22 Feb 1964]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.2, 1964, 295-297

TOPIC TAGS: rotational band, two-particle state, deformed even-even nucleus, nuclear moment of inertia

ABSTRACT: Recently there have been discovered two-particle excited states with energies about 1 MeV in a number of deformed even-even nuclei. (In these states there is no effective coupling between one of the pairs of protons or neutrons.) The quantum characteristics of both unpaired nucleons have been established for some of these states by C.J.Gallagher and V.G.Soloviev (Mat.-fis.skr.danske vid.selskab 2, No.2, 1962) and the author. In the present paper there is proposed a method for evaluating the "effective" moments of inertia of nuclei in some of these states. The method is based on the fact that there exists an analogy between the

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ACCESSION NR: AP4024054

two-particle excited states in even-even nuclei and excited states in odd-odd nuclei, inasmuch as in both cases there are present two unpaired nucleons. Calculations were performed for a number of rotational levels and the ensuing agreement between the calculated and experimental values indicates that the initial assumption regarding independence of the contributions from both unpaired nucleons to the moment of inertia is reasonable. Orig.art.has: 3 formulas, 1 figure and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gosudarstvennogo universiteta (Scientific Research Physical Institute, Leningrad State University)

SUBMITTED: 20Sep63

DATE ACQ: 08Apr64

ENCL: 00

SUB CODE: NS

NR REF SOV: 004

OTHER: 001

Card 2/2

VSR

ACCESSION NR: AP4024053

S/0048/84/028/002/0289/0294

AUTHOR: Peker, L.K.

TITLE: Concerning some properties of "vibrational" levels in deformed odd-A nuclei  
/Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14 to  
22 Feb 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.2, 1964, 289-294

TOPIC TAGS: odd-A deformed nucleus, vibrational level, octupole vibrational level, Gamma vibrational level, Beta vibrational level, level classification, nuclear level systematics

ABSTRACT: Recently a number of experimentors have searched for vibrational levels in odd-A deformed nuclei, analogous to the collective levels in even-even nuclei with  $I^\pi = K^\pi = 2^+$  ( $\gamma$ -vibrational levels according to the Bohr-Mottelson model or anomalous rotational levels in the Davydov model), levels with  $I^\pi = K^\pi = 0^+$ ,  $\nu^\pi = 0^+$  ( $\beta$ -vibrational levels) and levels with  $\nu^\pi = 0^-$ ,  $K^\pi = 0^-$ ,  $I^\pi = 1^-$  (octupole vibrational levels) ( $\nu$  is the projection of the angular momentum of the phonon on the nuclear symmetry axis). These searches have resulted in the discovery of  $\gamma$ -vibra-

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ACCESSION NR: AP4024053

tional levels in the following stable odd-A nuclei: Tb159, Ho165, Tm169, Er167, Re185 and Re187. This paper is devoted to analysis of the available data on such vibrational levels and elucidation of their distinctive characteristics. On the basis of the analysis predictions are made regarding the existence of different vibrational levels in other nuclei. It is noted that in all the examined nuclei the vibrational levels are shifted downward relative to the corresponding levels in the neighboring even-even nuclei. "The author is sincerely grateful to D.A.Varshalovich for useful and interesting discussions." Orig.art.has: 3 formulas, 2 figures and 3 tables.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gosudarstvennogo universiteta (Scientific Research Physical Institute, Leningrad State University)

SUBMITTED: 20Sep63

DATE ACQ: 08Apr64

ENCL: 00

SUB CODE: NS

NR REF SOV: 006

OTHER: 012

Card 2/2

ACCESSION NR: AP4024055

S/0048/84/028/002/0298/0301

AUTHOR: Peker, L.K.

TITLE: On expected peculiarities of decay of 6-quasiparticle isomeric states in odd-odd nuclei with  $A \approx 240$  Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14 to 23 Feb 1964

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.2, 1964, 298-301

TOPIC TAGS: isomeric state, 6 particle state, odd nucleus, spontaneous fission, high spin state, americum isomer, americum 242, americum 244, neptunium 240

ABSTRACT: In 1962 a number of investigators bombarding targets of Th, U, Pu and Am with heavy ions,  $\alpha$ -particles and deuterons observed an activity with a period of about 0.014 sec, decaying by spontaneous fission. It has been established that this activity is probably  $\text{Am}^{242}$ . Yet it is known that in this A and Z region the probability for spontaneous fission of ground and low-lying states is very small and the fission lifetime  $T_f$  is large. Thus,  $T_f = 7 \times 10^{10}$  years for  $\text{Pu}^{242}$ ,  $7.2 \times 10^6$  years for  $\text{Cm}^{242}$  and  $2 \times 10^{14}$  years for  $\text{Am}^{241}$ . Hence there must be special causes responsible for this great speeding up of spontaneous fission of the newly discovered iso-

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ACCESSION NR: AP4024055

meric state of  $\text{Am}^{242}$  (assuming that its total lifetime is equal to  $T_f$ ). On the basis of substitution of reasonable interpolated values into the liquid drop model formula for the probability for spontaneous fission it is concluded that the height of the potential barrier for the ground state of  $\text{Am}^{242}$  is about 5.5 MeV. Further analysis shows that the  $10^{24}$  fold increase in the probability for spontaneous fission characteristic of the new  $\text{Am}^{242}$  isomer may result from lowering of the potential barrier to about 2.4 MeV. Consequently, if one assumes that the lifetime of the new isomeric state of  $\text{Am}^{242}$  is wholly determined by fission, it may be inferred that the excitation energy of this state is about 2.4 MeV. The probable characteristics and nature of this state are analyzed; it cannot be a rotational or vibrational state and therefore must be a quasiparticle one. Examination of the probable Nilsson configurations for the lowest 6-particle states in  $\text{Am}^{244}$ ,  $\text{Am}^{242}$  and  $\text{Np}^{240}$  indicates that in these nuclei the lowest 6-particle states may be states with  $K \geq 23$  and an excitation energy of about 2 MeV. This, and further analysis of the available experimental data, leads to the conclusion that the newly discovered isomeric state of the odd-odd nucleus  $\text{Am}^{242}$  is the first example of a 6-quasiparticle state with  $K = I = 24$ . There is reason to expect that analogous isomeric states may exist in the neighboring odd-odd nuclei  $\text{Np}^{240}$  and  $\text{Am}^{244}$ . A distinctive characteristic of such states in these nuclei is the insignificant probability for  $\beta$  and  $\alpha$  decay as

Card 2/3

ACCESSION NR: AP4024055

compared with the probability for spontaneous fission. "The author is sincerely grateful to G.M.Flerov and S.M.Polikhanov for communication of their results prior to publication and B.S.Dzhelepov and K.A.Petrzhak for interesting discussions."  
Orig.art.has: 3 formulas, 1 figure and 1 table.

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskogo gosudarstvennogo universiteta (Scientific Research Physical Institute, Leningrad State University)

SUBMITTED: 20Sep63

DATE ACQ: 08Apr64

ENCL: 00

SUB CODE: NB

NR REF SOV: 004

OTHER: 002

Card 3/3

S/0030/63/000/005/0106/0108

ACCESSION NR: A300162A

AUTHOR: Peker, L. K. (Candidate of physical and mathematical sciences)

TITLE: Nuclear spectroscopy (Thirteenth Conference on Nuclear Spectroscopy of the Academy of Sciences SSSR in cooperation with the State Committee on Use of Atomic Energy SSSR, the Ministry of Higher and Intermediate Special Education in the USSR, and the Academy of Sciences Ukrainian SSR held in Kiev 25 January to 2 February)

SOURCE: AN SSSR. Vestnik, no. 5, 1963, 106-108

TOPIC TAGS: nuclear spectroscopy, Fermi liquid, nucleon, deformation, quadrupole moment, excited state, oscillatory level, spherical nucleus, lifetime, circular polarization, Gamma quanta, decay, radioactivity

ABSTRACT: A. B. Migdal reported on investigations in computing properties of the nuclear state by a method earlier developed by L. D. Landau. A. S. Davydov has continued to work on a model of nonaxial nuclear deformation. The report of B. S. Dzheleпов was devoted to quadrupole moments of strongly excited states of deformed even-even nuclei. V. F. Lutsenko and also L. V. Peker and Yu. N. Novikov have investigated new regions of deformed nuclei:  $Z = 88-86$  and  $N = 55-75$ . V. G. Solov'yev has shown that a consideration of twin correlations improves agreement

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ACCESSION NR: AF3001624

between theory of  $\alpha$ -decay and experiment. D. F. Zaretzkiy and M. G. Urin have investigated the microscopic structure of oscillatory levels of nonspherical nuclei. Urin has demonstrated a marked retardation (10-100 times) of  $\beta$  transitions at  $\gamma$  oscillation levels. The report of I. Kh. Lemberg, K. I. Yerokhina, and B. L. Birbrair was devoted to examinations of the properties of the first excited levels  $2^+$  in spherical even-even nuclei, and it furnished the first quantitative values of lifetime and character of the change from one group to the other. Ye. A. Smorodinskiy proposed a new classification of  $\beta$  transitions based on multipolarity of the transition. I. V. Estulin and A. A. Fetushkov reported on circular polarization of  $\gamma$  quanta emitted by nuclei during  $\beta$  decay. Nearly 100 papers were presented on experimental work relative to decay of actual radioactive nuclei, mostly by members of the Ob'yedinenyye institut ydernykh issledovaniy (United Institute of Nuclear Investigations) in Dubno, but many also by workers from the Moscow and Leningrad Universities and from the Radium Institute (Radium Institute). Investigations on  $\alpha$  spectra of Am and Cm isotopes were made in S. A. Baranov's laboratory at the Institut atomnoy energii (Institute of Atomic Energy) and at B. S. Pzhelerov's laboratory (Radium Institute). A report by O. F. Nemets had to do with reactions by deuterons. Much of this kind of work has been done at the Institut fiziki AN USSR (Institute of Physics AN Ukrainian SSR) and also by V. F. Litvin at the Radium Institute. I. S. Shapiro discusses the leading work of

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ACCESSION NR: AP3001624

recent years on direct nuclear reactions. New data on spectra for  $\text{Sm}^{150}$  and  $\text{Hg}^{200}$  were obtained by L. V. Groshev (Institute of Atomic Energy). D. M. Korinker, O. I. Sunbayev, and others presented information on energies of  $\gamma$  lines. New data on levels of different nuclei were obtained by K. I. Verokhina, Yu. P. Gengrskiy, and others. N. A. Vlasov investigated possible new phenomena by emission of retarded protons. Work on rare-earth isotopes with a precision mass spectrograph was carried out by R. A. Demirkhanov, V. V. Dorokhov, and K. I. Dzkuy at the Fizikotekhnicheskiy institut AN Gruzinskoy SSR (Physical and Technical Institute AN Georgian SSR). M. G. Meshcheryakov read a paper on the interaction of high-speed protons with complex nuclei. The conference demonstrated a considerable growth in level of work on nuclear spectroscopy.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 21Jun63

ECLA: 00

SUB CODE: FH

NO REF SOV: 000

OTHER: 000

Card 3/3

PEKER, L.K., kand. fiz.-matem. nauk

Twelfth Conference on Nuclear Spectroscopy held at Kiev. Vest.  
AN SSSR 33 no.5:106-108 My '63. (MIRA 16:6)

(Atomic spectra)  
(Atomic energy—Congresses)



S/048/63/027/002/022/023  
B104/B180

**AUTHORS:** Peker, L. K., and Novikov, Yu. N.

**TITLE:** Properties of odd and odd-odd nuclei with  $55 \leq Z$  and  $N \leq 75$

**PERIODICAL:** Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 2, 1963, 295 - 300

**TEXT:** R. K. Sheline et al. (Phys. Rev. Lett., 7, 446 (1961)) assumed that a big new region of deformed nuclei exists in the range  $Z = 50 - 82$  and  $N = 50 - 82$ . Here criterions for the presence or absence of an equilibrium deformation are studied, and within the frame work of the generalized Bohr-Mottelson model the properties of deformed odd and odd-odd nuclei of this range are described by wave functions and by the Nilsson diagram. In a lengthy discussion of experimental data it is shown that the hypothesis on the existence of a new range of deformed nuclei is correct. The wave functions of these nuclei can be calculated with  $\mu = 0.40 - 0.45$ . With the Nilsson diagram (Fig. 3) the parameter of the equilibrium deformation of nuclei located at the boundaries of new range (Fig. 4) are calculated. There are 4 figures.

Card 1/3

Properties of odd and odd-odd...

S/048/63/027/002/022/023  
B104/B180

ASSOCIATION: Nauchno-issledovatel'skiy fizicheskiy institut Leningradskiy gosuniversiteta im. A. A. Zhdanov (Scientific Physical Research Institute of the Leningrad State University imeni A. A. Zhdanov)

Fig. 3. Single-level nuclei out of the range  $55 \leq Z, N \leq 75$  at  $\mu = 0.40 - 0.45$  (Nilsson parameter  $\kappa = 0.05$ ).

Fig. 4. Equilibrium deformation as a function of proton and neutron numbers.

Card 2/3

Properties of odd and odd-odd...

S/O48/63/027/002/022/023  
B104/B180

Fig. 3

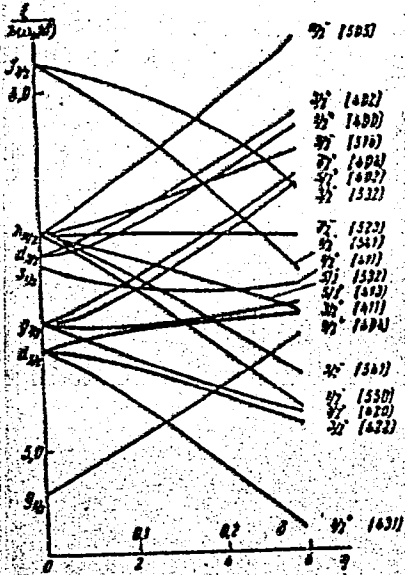
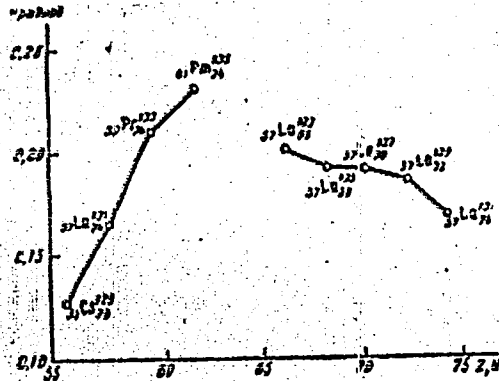


Fig. 4



Card 3/3

DZHELEPCV, Boris Sergeevich; PEKER, Leon Kaufmanovich; SERGEYEV,  
Viktor Olegovich; KECL'NOV, Yu.V., otv. red.; BARKOVSKIY,  
I.V., red.izd-va; SMIRNOVA, A.V., tekhn.red.

[Decay schemes of radioactive nuclei at  $A \gg 100$ ] Skhemy ras-  
pada radioaktivnykh iader  $A \gg 100$ . Moskva, Izd-vo AN SSSR,  
1963. 1958.p. (MIRA 16:11)

(Radioactive substances--Decay)

FEKER, L.K., kand.fis.-matem.nauk

Problems of nuclear spectroscopy. Vest.AN SSSR 32 no.4:125-127  
Ap '62. (MIRA 15:5)  
(Spectrum, Atomic)

PERER, M.Z.

Changes in the oxidation and reduction processes of generative cells  
in fiber flax during fertilization. Vestsi AN BSSR, Ser. bial. nav.  
no.3:51-61 '59. (MIRA 12:12)  
(Flax) (Oxidation-reduction reaction) (Fertilization of plants)

USSR/Cultivated Plants - Technical, Oléagineous, Sacchariferous. 1-7

Abs Jour : Tr. Zhur - Biol., No 2, 1950, 39411

Author : Teker, I.Z., Gurylovsk., Y.-S.

Inst : AS DSSR

Title : The Influence of Race and Soil on Health Injuries and Hybrid Forms of Flax.

Orig Pub : Izv. AN DSSR, S r. biol. n. 1957, No 2, 69-75.

Abstract : It is established on the basis of field and vegetation experiments that different varieties and hybrid of flax are not infected with fungus and bacterial diseases. Seeds collected from sick plants produced normal sprouts and a high yield of seeds and fiber when sown in good soil. Plants grown from such seeds showed no signs of disease. However, 100% infection of the plants with diseases, low germination, an abnormal growth and development

Card 1/2

- 113 -

PEKER, M.Z., kandydat biyalagichnykh navuk; GURYNOVICH, Ye.A., kandydat biyalagichnykh navuk.

Effect of peat bog soils in producing healthy flax hybrids. Vestsi AN BSSR. Ser. biial. nav. no.2:69-75 '57. (MLRA 10:9)  
(White Russia--Flax) (Peat soils)



PKKRR, M.Z., kandydat biyalagichnykh navuk.

Effect of boron on the growth and development of flax on peat bog  
soils. Vestsi AN BSSR, Ser. biial, nav. no.4:33-39 '56.

(Boron) (Peat soils) (Flax)

(MLRA 10:6)

ACCESSION NR: AP4019843

8/0181/64/006/003/0811/0817

AUTHORS: Kventsel', G. P.; Pekar, S. I.

TITLE: Energy of surface excitons at very small crystal momentum

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 811-817

TOPIC TAGS: surface condition, dielectric crystal, cubic crystal, surface exciton, crystal lattice structure, crystal lattice distortion

ABSTRACT: The authors have considered a semi-infinite crystal, the surface of which corresponds to a crystal face that includes two of the crystallographic axes. A surface exciton is defined as any excited state of a dielectric crystal for which the two-dimensional crystal momentum is a single continuous quantum number (the remaining quantum numbers are discrete). The authors have determined the surface energy for the two-dimensional crystal momentum for this surface exciton. The results were obtained for a very general case without use of models. The wave length of the exciton and its effective depth of penetration into the crystal are assumed to be much greater than the lattice constants or the depth of near-surface distortion of the lattice structure. Detailed examination is made of dipolar allowed excitons in cubic crystals and of nondegenerate excitons in any crystal.

Card 1/2

ACCESSION NR: AP4019843

The authors show that, in contrast to body excitons, surface excitons exhibit no energy break at the point where crystal momentum is zero. Orig. art. has: 34 formulas.

ASSOCIATION: Institut poluprovodnikov AN UkrSSR, Kiyev (Institute of Semiconductors AN UkrSSR)

SUBMITTED: 20Sep63

DATE ACQ: 31Mar64

ENCL: 00

SUB CODE: SS, EC

NO REF SOV: 003

OTHER: 000

Card 2/2

PEKER, V.

"Equipment for the production of illustration board" by S.P. Khvatt.  
From "Przeład Papierniczy" no. 10/117, 1953. Reviewed by V.Peker.  
Dum.prom. 32 no.6:23-25 Je '57. (MLRA 10:8)  
(Poland--Papermaking machinery)  
(Khvatt, S.P.)

ZENCHENKO, F.I.inzh.; PEKER, Ya.A.,inzh.

Producing protective atmospheres for bright annealing. Stal'  
12 no.2:151-155 F '59. (MIRA 12:2)

1. Magnitogorskiy metallurgicheskiy kombinat.  
(Annealing of metals) (Protective atmospheres)

ESTRIN, B.M.; PETLUN, A.P.; PEKER, Ya.A.

Starting, adjusting, and studying the operation of a prospective  
gas station. Ital' 24 no.5:472-475 My '64. (S. 24 17-12)

1. Tsentronegrometallurgprom i Novolipetskiy metallurgicheskiy zavod.

AUTHORS: Zenchenko, F.I. and  
Peker, Ya.A., Engineers

SOV/133-59-2-18/16

TITLE: The Production of Protective Atmosphere for Bright  
Annealing (Proizvodstvo zashchitnoy atmosfery dlya  
svetlogo otzhiga)

PERIODICAL: Stal', 1959, Nr 2, pp 151-157 (USSR)

ABSTRACT: The development of the production of a protective atmosphere for bright annealing of cold rolled sheets on the Magnitogorsk Works is described. The atmosphere is produced by the combustion of a mixture of coke oven and blast furnace gas of the following composition %: CO 17-19; CO<sub>2</sub> 7-10; O<sub>2</sub> - 0.2; CnHm - 0.1; H<sub>2</sub> 25-30 CH<sub>4</sub> 8-12. The technological scheme of the production is shown in fig.4. The characteristic feature of the plant is the automatic control of the gas to air ratio, shown in fig.5, which is based on the differential pressure of the gas before and after combustion. The dependence of the CO content in the protective atmosphere on the differential pressure before and after combustion is shown in fig.6. It was established that in order to obtain high quality surface of cold rolled sheets by bright

Card 1/2

SOV/133-59-2-18/26

The Production of Protective Atmosphere for Bright Annealing

annealing the protective atmosphere should be dried to -30°C dew point and contain 3-5% of hydrogen, up to 1.5% of carbon dioxide and 3-4% of carbon monoxide. The necessary conditions for obtaining the protective atmosphere of constant composition are as follows: stability of the calorific value of the initial gas and an automatic maintenance of the gas to air ratio passing into the combustion chamber. There are 6 figures and 2 references, both of which are Soviet.

ASSOCIATION: Magnitogorskiy Metallurgicheskiy Kombinat (Magnitogorsk Metallurgical Combine)

Card 2/2



PEKER, Ya.D., inzh. (Kiyev)

Economic indices of air conditioning systems for buildings  
of mass production. Vod.i san.tekh. no.12:8-10 D '65.

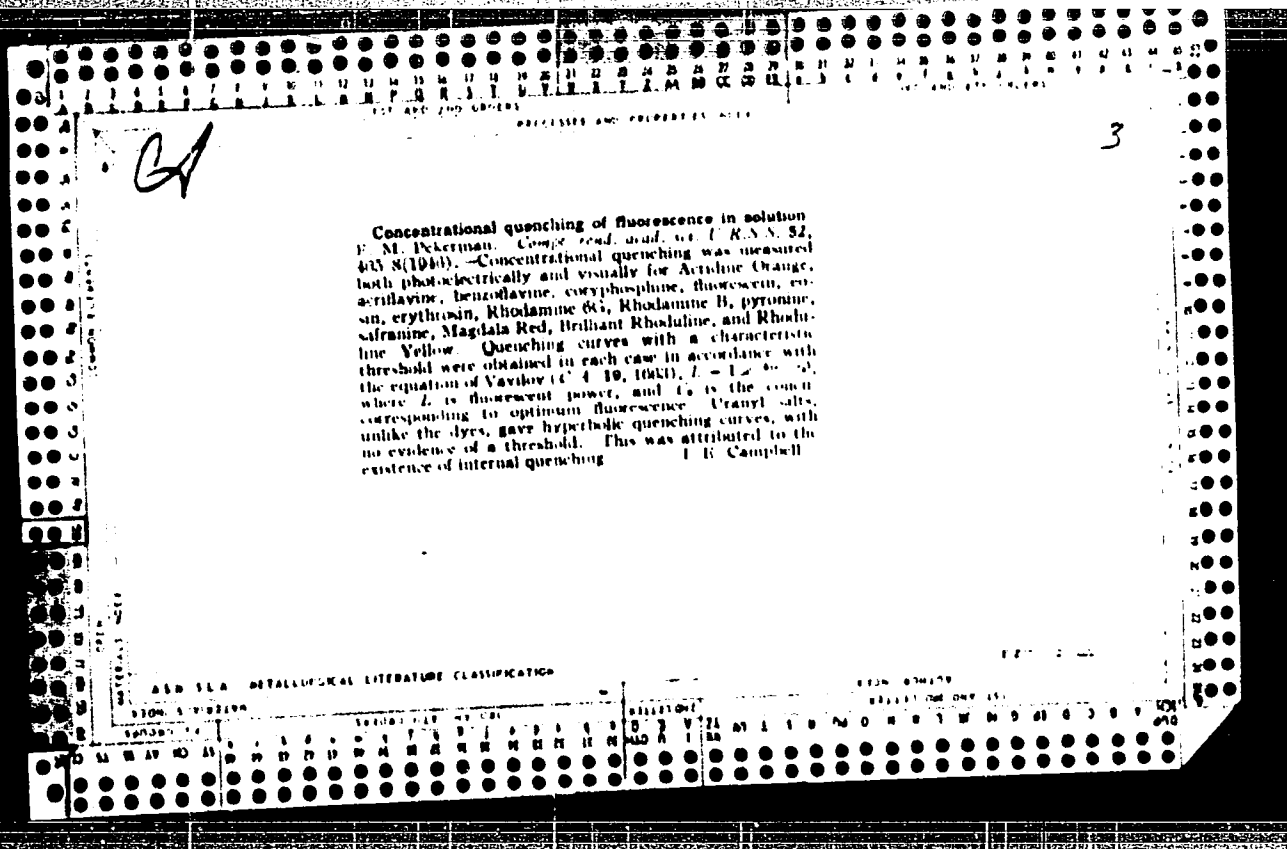
(MIRA 19:1)

PEKER, Ya.D. (Kiyev)

Heating and ventilation apparatus and conditioners for  
residential and public buildings. Vod. 1 san. tekhn. no.2:  
10-13 F '61. (MIA 14:6)  
(Dwellings--Heating and ventilation)  
(Public buildings--Heating and ventilation)

FEKER, Yakov Davidovich; KIYANICHENKO, N.S., red.

[Improving the microclimate of apartment houses and  
public buildings] Uluchshenie mikroklimate zhilykh i  
obshchestvennykh zdaniy. Kiev, Gosstroizdat USSR,  
1964. 96 p. (MIRA 17:6)



CA

3

**Concentration-quenching of fluorescence of dyes in solution in the presence of foreign quenchers** F. M. Pikel'man, *Compt rend acad sci P R S S* 52, 207 (1959) (U. S. A. 41, 2044) The concn-quenching of several dyes the fluorescence of which was extinguished beforehand by the introduction of foreign substances, such as resorcinol and KI, was investigated. The concn-quenching curves for rhodamine B, tryptoflavin, fluorescein, rhodamine 6G, and acridine orange with and without a quencher are given. These show that when a quencher is added, the curves shift toward greater concns. Thus quenching begins later than in the case of dye solns. without quenchers. In the quenching of rhodamine in aq. by aniline, the concn-quenching curve begins sharply to fall instead of shifting toward greater concns. This is due to a chem. reaction as proved by the shifting of the fluorescence of the spectrum. Values obtained experimentally on rhodamine agree with those obtained theoretically. K. R. Hesse

ASD 114 DETAILER LITERATURE CLASSIFICATION

ACCESSION NR: AP4020963

S/0051/64/016/003/0496/0500

AUTHOR: Pekerman, F.M.; Petoshina, L.N.

TITLE: Investigation of the luminescence efficiency of electroluminescent capacitors

SOURCE: Optika i spektroskopiya, v.16, no.3, 1964, 496-500

TOPIC TAGS: electroluminescence, electroluminescence efficiency, luminescence yield, electroluminescent capacitor design, electroluminescence excitation

ABSTRACT: The luminescence yield or efficiency of electroluminescent capacitors is one of their most important characteristics, for it is an indication of the efficiency of conversion by the device of electric to radiant energy. The purpose of the present work was to develop a reliable procedure for determining the luminescence efficiency of electroluminescent capacitors and electroluminophors. The paper gives the results of measurements of the yield of electroluminescent cells prepared in different ways and excited under different conditions. The light flux was measured by means of a selenium photocell with a correcting filter; the power consumed by the capacitor was evaluated by an oscillographic method, for the usual method of calcu-

Card 1/3

ACCESSION NR: AP4020963

lating the power consumed is valid only for sinusoidal voltages. The measurements showed that the efficiency goes through a maximum with increasing voltage; with variation in frequency the luminescence efficiency rises to a peak in the range from 2000 to 4000 cps (the exact value differs for different capacitors). Measurements were also made using the same luminophor (not specified) in different dielectrics (resin varnishes); the best results were obtained with an epoxy resin. Tests showed that the efficiency increases with increase of the luminophor concentration in the dielectric, but to a lesser degree than the brightness because the power consumption also rises. Measurements with phosphors of different grain size indicated an increase in efficiency with reduction in grain size owing to reduction of the power consumed. Aging experiments indicated that with aging the efficiency decreases more slowly than the output (brightness), again because the power consumption decreases with decrease in the conductivity of the aging luminophor. "In conclusion, we express our gratitude to A.M.Bonch-Bruyevich and Ya.A.Oksman for consultations on a number of questions involving procedure and to F.Ya.Vaysberg for preparing some of the electroluminescent capacitors." Orig.art.has: 1 formula, 2 figures and 2 tables.

2/3

Card

ACCESSION NR: AP4020963

ASSOCIATION: none

SUBMITTED: 21May63

DATE ACQ: 02Apr64

ENCL: 00

SUB CODE: PH

NR REF SOV: 001

OTHER: 006

Card 3/3



ZHUKOV-VEREZHNIKOV, N.N.; MYSKIY, I.N.; PEKHOV, A.P.; TRIBULEV, G.P.;  
RYBAKOV, I.N.; RYBAKOVA, K.D.

Importance of microbiological objects in the study of  
pathological changes in genetic coding. Vest.AMN S.S.S.R.  
17 no.12:49-59 '62. (MIRA 16:4)

1. Institut eksperimental'noy biologii AMN SSSR.  
(MICROORGANISMS) (GENETICS)

PEREKMAN, F. M.

USSR/Physics  
Phosphors  
Crystals

Jul 1948

"New Method of Studying the Absorption Spectra of Crystal Phosphors," Ye. M. Brumberg, F. M. Perekman, 4 pp

"Dok Ak Nauk SSSR" Vol LXI, No 1

At present there is no reliable data on the absorption spectra of crystallophosphors. This is due to the considerable difficulty experienced in studying the absorption spectra of fine crystalline powders. Authors describe procedure for taking absorption spectra of a single crystal, and give some preliminary data on the absorption spectra of crystal phosphors. Submitted 3 May 1948.

PA 8/49 T106

PEKERMEN, P. M.

Jan/Feb 49

USSR/Physics  
Fluorescent Materials  
Luminescence

"Experimental Study of Energy Migration in Fluorescent Solutions," S. I. Vavilov, M. D. Galanin, P. M. Pekerman, 15 pp

"Iz Ak Nauk SSSR, Ser Fiz " Vol XIII, No 1

Macroscopic physical characteristics of rarefied gases and vapors are simply the sum of the microscopic characteristics of the separate molecules. In condensed gases, however, a qualitative change in molecular characteristics occurs due to interaction, and therefore gas characteristics differ from those of the separate particles. Studies on a group of such collective phenomena: effect of concentrating solutions of complex organic molecules on their photoluminescence, which in turn is dependent on their radiation and absorption spectra, yield, polarization, and duration.

PA 36/49T101

PEKERMANN, F. M.

Mar/Apr 49

USSR/Physics  
Phosphors  
Spectra, Absorption

"New Method of Investigating the Absorption Spectra of Crystallophosphors," Ye. M. Brumberg, F. M. Pekerman, State Opt Inst, 6 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIII, No 2

Developed method for recording absorption spectra of single crystals for small crystalline powdery phosphors. This method obviates effects of diffusive dispersion (inherent in powders) on measurements and permits study of absorption in the ultra-violet region close to the visible band by using very thin crystals. Recorded absorption spectra of ZnS-, ZnS-Ci-, ZnS.CdS- and ZnS-Mn-phosphors at wave lengths of 405 to 254 millimicrons.

PA 42/49T83

PEKERMEN, F. M.

USSR/Physics - Phosphors  
Spectra

May 50

"Certain Properties of Phosphate Phosphors," V. V. Zelinskiy, F. M. Pekerman, T. V. Timofeyev, B. I. Vaynberg, State Opt Inst, 5 pp

"Zhur Eksper i Teoret Fiz" Vol XX, No 5

Describes properties of phosphors prepared from phosphates of Cd, Ca, Sr and activated Mn, Pb, Sb, Ce, or combinations Mn  $\rightarrow$  Pb and Mn  $\rightarrow$  Sb. Gives their absorption and radiation spectra, damping laws, and temperature dependence of brightness. Submitted 1 Sep 49.

PA 160T108

1. BUNDEL', A. A.; VAYNBERG, V.I.; DOBROLYUBSKAYA, T.S.; ZOLINSKIY, V.V.; PEKERMEN, F.M.;  
SMIRKOVA, R.G.; TROFIMOV, A.K.; FRENKEL', S.P.
2. USSR (600)
4. Phosphors
7. Development and study of luminophors based on phosphates for luminescent lamps.  
Izv.AN SSSR. Ser.fiz. 15 no.6, 1951.

9. Monthly List of Russian Accessions, Library of Congress, January 1953, Unclassified.

PEKerman, F. M.

184T107

USSR/Physics - Sun Lamps

11 Jun 51

"Phosphors for Sun Lamps," I. I. Kalinichenko, F. M. Pekerman, A. K. Trofimov

"Dok Ak Nauk SSSR" Vol LXXVIII, No 5, pp 887-888

Describes application of calcium phosphate, activated by thallium. This phosphate extends ultraviolet spectrum and has max radiation at 325 mμ. First exptl luminescent lamps with this phosphate were constructed by S. I. Levikov and gave excellent results in med tests. Submitted by Acad A. N. Terenin 14 Apr 51.

184T107

PEKERMANN, F. M.

USSR/Physics-Luminiscence, for defectoscopy

FD-1235

Card 1/1 Pub. 153-19/22

Author : Vaynberg, B. I., Danilov, V. P. and Pekerman F. M.

Title : Luminescent lamp for analysis of luminiscence

Periodical : Zhur. tekhn. fiz., 24, 1707-1710, Sep 1954

Abstract : A source of luminiscence excitation for the analysis of materials is described. The source consists of a luminescent vacuum tube made of glass transparent in the near ultraviolet up to 360 millimicrons and absorbing in visual light (glass UFS-4). This lamp is considered advantageous in comparison with other. Indebted to P. P. Feofilov and S. I. Levikov. Three references including one US.

Institution :

Submitted : January 1954



PEKHERMAN, I. M.

KAZANKIN, O.N.; PEKHERMAN, P.N.; PETOSHINA, L.N.

Zinc sulfide-base electroluminophor. Izv. AN SSSR. Ser. fiz. 21  
no.5:721-731 My '57. (MLRA 10:8)

1. Gosudarstvennyy institut prikladnoy khimii.  
(Luminescence--Congresses) (Phosphore--Congresses)

24(4), 24(6)

SOV/51-6-5-18/34

**AUTHORS:** Kazankin, O.N., Pekerman, F.M. and Petcshina, L.N.

**TITLE:** Electroluminescent Phosphors Based on Sulphides and Selenides  
(Elektroluminofory na sul'fidselenidnoy osnove)

**PERIODICAL:** Optika i Spektroskopiya, 1959, Vol 6, Nr 5, pp 672-677 (USSR,

**ABSTRACT:** Efficient ZnS.ZnSe-Cu electroluminescent phosphors cannot be obtained by heating in a stream of H<sub>2</sub>S + HCl because, even if one starts with pure ZnSe, the final substance contains no more than 40% of ZnSe. Obviously the stream of H<sub>2</sub>S + HCl produces a considerable replacement of selenium by sulphur. Under such conditions the electroluminescent phosphors had emission maxima at wavelengths not longer than 530-540 mμ and their emission brightness was much smaller than that of the usual green electroluminescent phosphors based on ZnS-Cu. The authors prepared ZnS.ZnSe-Cu phosphors by placing a charge in a horizontal quartz tube /<sup>and</sup> passing over it a stream of H<sub>2</sub>S + HCl for 30 mins at room temperature. Then the tube was placed in a furnace, but the H<sub>2</sub>S + HCl stream was no longer passed over it. Even then the amount of ZnSe in the final phosphor was always smaller than in the original charge. The authors found that with increase of the amount of ZnSe the electroluminescence spectra of the phosphors are

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## Electroluminescent Phosphors Based on Sulphides and Selenides

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shifted towards longer wavelengths (Fig 1). By varying the amount of ZnSe from 10 to 100% it was possible to obtain phosphors whose emission maxima lie in the region from 510 to 630 m $\mu$  when excited with a 5000 c/s, 400 V field. The emission spectrum of each phosphor was found to depend on the frequency and voltage of the applied field and on temperature. With increase of frequency the emission spectrum was displaced towards shorter wavelengths and this displacement was particularly clear in phosphors with small amounts of ZnSe (Fig 2). Increase of the applied voltage from 350 to 700 V displaced slightly the emission spectra towards short wavelengths (this displacement did not exceed 5 m $\mu$ ). Heating of phosphors shifted their emission towards longer wavelengths (20 m $\mu$  displacement on change of temperature from -10°C to +50°C). The relative emission brightness of phosphors with various amounts of ZnSe is given in Table 2 (ZnS-Cu emission was taken as 100). Table 2 shows that the relative emission brightness of ZnS.ZnSe-Cu phosphors varied from 1 (70% of ZnSe) to 29 (10% of ZnSe). The results obtained contradicted theoretical predictions that addition of Se should increase electroluminescent brightness. Addition of Se affected the dependence of the emission brightness on the frequency and voltage of the applied field. The voltage dependence of brightness

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## Electroluminescent Phosphors Based on Sulphides and Selenides

(Fig 3), even in phosphors with large amounts of ZnSe, followed Zalm's law (Ref 2)

$$B = A \exp(a/\sqrt{U}),$$

where B is the brightness,  $\nu$  is the frequency of the applied field, U is the applied voltage (up to 900 V) and the quantities A, a are constants. It was found that phosphors with large amounts of ZnSe begin to emit at smaller voltages and the almost-linear portions of the voltage dependences of their brightness rise more sharply. The frequency dependences (0-15 kc/s) are shown in Fig 4. It is found that at high frequencies saturation does not occur in phosphors with large amounts of ZnSe. Fig 5 shows the temperature dependences of brightness of ZnS.ZnSe-Cu phosphors in the region from -140 to +30°C. The brightness rises first with temperature, reaches a maximum and then falls. On increase of the amount of ZnSe in the phosphor the fall begins at lower temperatures. All the described properties of phosphors with large

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