FILIPPOV, D. P.

Cand Geol-Min Sci - (diss) "Conditions of the accumulation of coal-bearing formation C-4/2 of the Middle Carboniferous Period in the Tatsinskiy region of Eastern Donbass." Rostov-na-Don, 1961. 22 pp; (Ministry of Higher and Secondary Specialist Education RSFSR, Rostov-na-Don State Univ, Saratov Order of Labor Red Banner State Univ imeni N. G. Chernyshevskiy); 175 copies; price not given; (KL, 5-61 sup, 181)

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.

Determination of the acidity of hydrofluoric acid solutions by means of an ion-exchanging membrane electrode. Zhur.fiz.khim. 36 no.10:2280-2282 O '62. (MIRA 17:4)

1. Khimiko-tekhnologicheskiy institut imeni Mendeleyeva, Moskva.

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.

Studying the electrode functions of anion exchange membranes based on the EDE-10P resins. Trudy MKHTI no.47:178-183 '64.

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.; VORONOVSKAYA, M.N.

Use of ion exchange membranes in the calcium form as indicator electrodes. Trudy MKHTI no.47:184-188 '64.

Formation of protective films on the surface of cast iron. Ibid.:189-192

Sand fused on iron castings and role of cast iron silicon in its formation. Ibid.:193-197 (MIRA 18:9)

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.; KUPRYUNIN, G.I.

Behavior of a membrane ion exchanger electrode in solutions of hydrofluoric acid and its salts. Zhur. anal. khim. 18 no.1:13-19 Ja '63. (MIRA 16:4)

1. Mendeleyev Moscow Chemico-Technological Institute.
(Hydrofluoric acid) (Ion exchange)
(Electrodes)

GORD'YEVSKIY, A.V.; FILIPPOV, E.L.

Properties of an ion-exchange membrane electrode in ammonium fluoride solutions. Zhur. fiz. khim. 37 no.12:2780-2781 D '63.
(MIRA 17:1)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva.

GORDIYEVSKIY, A.V.; ZOTOV, Yu.A.; FILIPPOV, E.L.

Electrode properties of ionite membranes. Trudy MKHTI no.43: 40-49 '63. (MIRA 17:10)

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.; SHTERMAN, V.S.

Use of ion-exchange membranes for the control and regulation of concentrations of some complexons. Zhur. anal. khim. 19 no.3:282-285 '64. (MIRA 17:9)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva.

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Use of the ion echange membrane electrode for measuring LiCl concentration in amyl alcohol. Zhur. fiz. khim. 38 no.5: 1344-1347 My '64. (MIRA 18:12)

1. Khimiko-tekhnologicheskiy institut imeni Mendeleyeva. Submitted July 4, 1963.

GORDIYEVSKIY, A.V.; FILIPPOV, E.L.; SHTERMAN, V.S.; TRIZNO, V.V.

Potentiometric titration in anhydrous acetic acid by means of an ion-exchange membrane electrode. Zhur. anal. khim. 20 no. 11: 1164-1168 '65 (MIRA 19:1)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni D.I. Mendeleyeva. Submitted June 15, 1964.

FILIPPOV, F.F.

Machine for filing disk saws. Rats. predl. na gor. elektrotransp. no.9:30-31 '64. (MIRA 18:2)

1. Kirovskoye depo Tramvayno-trolleybusnogo upravleniya Leningrada.

MAKHOTIN, Ye.A., inzh.; PISHCHIKOV, R.S., inzh.; FILIPPOV, F.P., inzh.

New earthmoving machinery for water management construction.
Trudy Giprovodkhoza no.25:41-51 '63. (MIRA 18:6)

ZHEREBTSOV, V.V., inzh.; PISHCHIKOV, R.S., inzh.; FILIPPOV, F.P., inzh.

Using earthmoving machinery in water management. Trudy Giprovodkhoza no.25:52-71 '63. (MIRA 18:6)

AGEYEVA, A.P.; AKSENOVA-CHERKASOVA, A.S., aspiranka; VELIKANOV, L.N., bibliotekar'; GAVVA, F.M.; GIRENKO, P.D., Geroy Sots. truda; GUBANOV, M.M., pensioner; GUS'KOVA, T.K., nauchnyy sotr.; DAVYDOV, A.G., prepodavatel'; DANILEVSKIY, V.V., prof., dvazhdy laureat Stalinskoy premii; DOVGOPOL, V.I., laureat Stalinskoy premii; YELOKHIN, M.F.; YERMAKOV, A.D.; IVANOV, V.G., prepodavatel'; KOVALEVICH, V.K.; KOVALEVSKAYA, Ye.S., zhurnalistka; PANKRATOV, A.G.; POPOVA, F.M.; URYASHOV, A.V.; FEDORIN, I.M., kand. ist. nauk; FILIPPOV, F.R.; CHUMAKOV, N.P.; SHEPTAYEV, K.T., zhurnalist; VAS'KOVSKIY, O.A., kand. ist. nauk, retsenzent; KULAGINA, G.A., kand. ist. nauk, retsenzent; GORCHAKOVSKIY, P.L., prof., doktor biol. nauk, retsenzent; BAKHMUTOVA, V., red.; SAKNYN', Yu., tekhn. red.

[Nizhniy Tagil]Nizhnii Tagil. Sverdlovsk, Sverdlovskoe knizhnoe izd-vo, 1961. 294 p. (MIRA 16:1)

1. Nizhne-Tagil'skiy krayevedcheskiy muzey (for Ageyeva, Gus'kova). 2. Zaveduyushchiy gorodskim otdelom narodnogo zdravookhraneniya, Nizhniy Tagil (for Velikanov). 3. Zaveduyushchiy gorodskim sel'skokhozyaystvennym otdelom goroda Nizhniy Tagil (for Gavva). 4. Nachal'nik upravleniya stroitel'stvom Sverdlovskogo sovnarkhoza (for Girenko). 5. Deystvitel'nyy chlen Akademii nauk Ukr. SSR, Leningradskiy politekhnicheskiy institut (for Danilevskiy).

(Continued on next card)

ISAYKINA, Z.S.; FILIPPOV, F.S.

Calculi in the urethral diverticula. Urologiia no.5:69 '61.
(MIRA 14:11)

1. Iz urologicheskogo otdeleniya (zav. - dotsent V.V. Bundiko) Orenburgskoy oblastnoy klinicheskoy bol'nitsy i khirurgicheskogo otdeleniya (zav. F.S. Filippov) Buguruslahovskoy gorodskoy bol'nitsy.

(CALCULI, URINARY)

BELASHOV, G., kand. ekon. nauk; KOZIN, A.; LYASHENKO, P.; FILIPPOV, G., dots.

"Economics, organization, and planning of grain milling" by D.N. Gavrichenkov. Reviewed by G. Belashov and others. Muk. elev. prom. 24 no.11:31-32 N '58. (MIRA 11:12)

1. Moskovskiy tekhnologicheskiy institut pishchevoy promyshlennosti (for Belashov, Filippov). 2. Direktor Leningradskogo mel'nichnogo kombinata im. S.M. Kirova (for Kozin). 3. Nachal'nik Planovogo otdela Moskovskogo mel'nichnogo kombinata No.3 (for Lyashenko).

(Grain milling)
(Gavrichenkov, D.N.)

BUGRAYEV, A.; LADIKOV, A.; ZABOLOTSKIY, K.; FILIPPOV, G., kand.ekonomicheskikh nauk

"Problems concerning the economy of grain receiving enterprises" by A.A. Borinevich. Reviewed by A. Bugraev and others. Muk.-elev. prom. 28 no.6:30-32 Je '62. (MIRA 15:7)

1. Moskovskoye oblastnoye upravleniye khleboproduktov (for Bugrayev). 2. Kiyevskoye upravleniye khleboproduktov (for Ladikov). 3. Rostovskoye upravleniye khleboproduktov (for Zabolotskiy). 4. Moskovskiy tekhnologicheskiy institut pishchevoy promyshlennosti (for Filippov).
(Grain elevators) (Borinevich, A.A.)

S/117/60/000/012/015/022
A004/A001

AUTHORS: Malinina, N., Molodkina, M., Datskiy, M., Filippov, G.

TITLE: Cement Models for the Manufacture of Dies

PERIODICAL: Mashinostroitel', 1960, No. 12, p. 36

TEXT: Generally the complex profile of the working surface of forging dies for blades is machined on copying milling machines according to wooden model templets. These models lose their geometrical shape rather quick because of temperature fluctuations and the effects of air moisture in the storing rooms. Instead of having model sets for forging dies made of wood, the manufacture of which takes a model maker of the 6th grade some seven days, the Leningradskiy metallicheskiy zavod (Leningrad Metallicheskiy Plant) produces these models from cement. The templets used for the cement-model making serve also for the checking of the die shape during the milling operation and fitting work. At the beginning a frame work is manufactured from templets, distance sleeves and gaging pins. Braces are mounted on the sides of the framework, tightened by wedges and cramps. Then diluted construction gypsum is filled into the framework, the side walls of which are removed after the solidification of the gypsum. The profile of the die

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Cement Models for the Manufacture of Dies

model is then shaped subsequently between every pair of neighboring templets, the surplus gypsum being cut away flush with the templet profile. Those parts of the profile for which the framework does not provide a templet is done by surface gaging. The ready gypsum mold is covered with a thin nitro-lacquer coating and greased with stearin diluted with kerosene in order to prevent the gypsum from sticking to the cement. Side walls are mounted to the ready mold and the cement is poured in. The process of the cement model setting takes 3-4 days. The cast cement model-templet has a smoother and better surface than the wooden ones, while its manufacture costs by 2-2.5 times less than that of wooden model-templets. There are 4 figures.

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FILIPPOV, G.

Sound signaling in the river fleet. Rech. transp. 24 no.3:56 '65.
(MIRA 18:5)

1. Leningradskiy institut vodnogo transporta.

FILIPPOV, G.A., inzhener.

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[Organization of lumber camp construction and the preparation of estimates] Organizatsiia stroitel'stva lespromkhozov i sostavlenie smet. Moskva, Goslesbumizdat, 1952. 211 p. (MLRA 6:11)

(Lumber camps) (Lumbering--Accounting)

FILIPPOV, G. A.

Road construction

Moving earth efficiently in the construction of logging roads. Les. prom. no. 5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, August, 1952 1953. Unclassified.

FILIPPOV, Georgiy Afanas'yevich; KOVNER, V.N.; SHAKHOVA, L.I., red.izd-va; PARAKHINA, N.L., tekhn.red.

[Switches for narrow-gauge railroads] Uzkokoleinye strelochnye perevody. Moskva, Goslesbumizdat, 1959. 131 p. (MIRA 13:2)
(Railroads--Switches)

SOV/96-60-2-3/24

AUTHORS: Deych, M. Ye., Doctor of Technical Sciences, Zaryankin, A. Ye., Candidate of Technical Sciences, Filippov, G.A., and Zatsepin, M. F., Engineers

TITLE: Methods of Increasing the Efficiency of Turbine Stages with Short Blades

PERIODICAL: Teploenergetika, 1960, Nr 2, pp 18-24 (USSR)

ABSTRACT: The efficiency of the high-pressure parts of large turbines having fixed and runner blades of improved profiles and provided with good internal glands and seals reaches 78 to 80%. Further improvements in profiling are not likely to give much better efficiency, as modern blades already have very low profile-losses. However, the efficiency of intermediate high-pressure stages can be appreciably increased by special profiling of the fixed blades in the meridional plane and by using runner blades with diffuser channels. Meridianal profiling is now being developed to give stages of constant reaction. In high-pressure stages this problem is best solved by trying to reduce the end losses. In order to reduce the end losses in fixed blades, it is necessary to reduce the velocity on sections of maximum

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channel curvature where secondary flows are most marked. This ensures turbulent flow and so reduces the thickness of boundary layers on the backs of the blading and on the upper and lower walls of the channel. This is accomplished by profiling the channels along their height (profiling in the meridional plane). The profiling may be symmetrical with straight or curved faces, or asymmetrical with straight or curved generating lines. Asymmetrical profiling makes it possible both to reduce the end losses and to reduce the radial pressure gradient. The present article gives test results on blading with asymmetrical profiling over the height, both with the blades mounted in straight rows and on rotors. Fig 1 gives graphs of the loss distribution over the height of a straight row of blades with different shapes of the upper rim. It will be seen that the best results are obtained with asymmetrical profiling beyond the position where the curvature of the channel is greatest. The reduction in fixed-blade losses by the use of asymmetrical profiling is explained by reference to the

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graph of pressure distribution across the profile given in Fig 2. It is also pointed out that in the blading with asymmetrical profiling the point of minimum pressure is displaced somewhat in the direction of flow. Hence the length of the turbulent section and the pressure gradients in it are somewhat reduced. This has the effect of reducing the profile losses. The loss-coefficient curves plotted in Fig 3 clearly show the advantages of blades with asymmetrical profiling over the height, particularly for short blading. The effect of this special profiling is greater when the blades are mounted on a rotor because the losses at the blade roots are particularly reduced, thereby helping to equalise the velocity distribution. The best shape of profiling is then considered. Graphs of loss reduction as a function of profiling compression, plotted in Fig 4, indicate that the optimum amount of compression depends on the blade length. The shape of the compression curve may be based on calculation of the flow potential in the channel. A diagram of a profiled channel with three

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different degrees of compression is given in Fig 5, and calculated and experimental velocity distributions over a straight arrangement of blading caps TS-2A is given in Fig 6. It will be seen that agreement between theory and experiment is good. Tests on intermediate-stage fixed blades with diffuser inlets showed that under static conditions their use does not influence the effect of asymmetrical profiling over the height. Test results are plotted in Fig 7 and it is considered that the use of fixed blades with a complicated shape of outer rim increases the efficiency of intermediate stages with short blades. Further information about the use of fixed blades with asymmetrical profiling was obtained by testing groups of stages in the experimental steam turbine of the Moscow Power Institute. All stages have the same mean diameter of 400 mm; the other dimensions are tabulated. Tests were made on six stages of various blade lengths. Some were made with fixed blades profiled over the height and some with unprofiled blades. All the diaphragms were welded.

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The tests covered a fairly wide range of velocity ratio and heat drop. The results, plotted in Fig 8, indicate that at optimum velocity ratio the stage with profiled blades has 2% higher efficiency with a blade length of 25 mm, and 3% higher with a length of 15 mm. The relative increase in efficiency by the use of asymmetrical profiling is 2.5% and 3.7 to 4% respectively. Asymmetrically-profiled blades continue to offer advantages when operation is not at the designed conditions, as is explained by reference to other curves on Fig 8. Important results were obtained on measuring the reaction in the blade root and tip sections. The use of asymmetrical profiling reduces the variations in static pressure distribution over the pitch in the sections. As will be seen from the graphs plotted in Fig 9 there was also a marked reduction in the difference between the reactions at the root and tip. The value of the outlet area of the guide vanes may be calculated from formula (1). An approximate method is given for calculating the asymmetrical profiling, using

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Eq (2). It is concluded that asymmetrical profiling of the fixed blades across the height helps to give stages with constant reaction over the radius. In stages with very short blading any profiling of the channels over the height undertaken to reduce the difference in reaction should also be designed to reduce the end losses. The method of asymmetrical profiling that is proposed in this article solves these two problems. There are 9 figures, 1 table and 4 Soviet references.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Institute)

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E194/E484

AUTHORS: Deych, M.Ye., Doctor of Technical Sciences,
Zaryankin, A.Ye., Candidate of Technical Sciences,
Filippov, G.A. and Zatsepin, M.F., Engineers

TITLE: Increasing the Efficiency of Short Turbine Runner Blades

PERIODICAL: Teploenergetika, 1960, Nr 8, pp 51-56 (USSR)

ABSTRACT: Work published in Teploenergetika, 1956, Nr 6, and by Nippert in Germany in 1929 has shown that if the angle through which a flow turns in a channel is great and the static pressures at inlet and outlet are not very different, the losses due to secondary flow in curved ducts and in short blades are not minimum when the flow is steadily constricted. Nippert showed that when the flow is turned through a large angle, the use of expansion followed by constriction of the ducts between the blades greatly reduces the terminal losses. The theoretical problem is very complicated and it is best to determine the optimum velocity distribution by experiments. Tests were made on the Moscow Power Institute blading for subsonic speeds details of which are given in Table 1. These profiles are intended for

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short blades and were obtained by cutting back the concave surfaces in such a way that the channel between the blades first expands then contracts. The convex surface of the blade is left unaltered. Typical duct dimensions for blades shapes TR2A and TR-2Ak are shown in Fig 1. In the new blades the inlet section is greater than the outlet section and the maximum section at the middle of the blades is greater than the inlet section. With blades of this type, the variations in channel section are, of course, affected by the pitch and angle of installation of the blading. Tests were made with blades of various heights and various ratios of maximum inlet and discharge widths. The range of variation of the main geometrical characteristics for blades of group Ak are shown in Table 2. The tests were made in the wind tunnel of the Moscow Power Institute with nozzles ranging from 20 to 50 mm high. The advantages of an expanding and constricting channel for short blades was confirmed by experiment. Pressure diagrams for channels of

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different shapes with blade type TR-2A are shown in Fig 1. The results are discussed and it is concluded that there are three causes of the reduced terminal losses in blades with expanding and constricting channels, namely: the direction of the flow is altered at the lower mean speed; at the outlet section where secondary flows are intensified, the channel is constricted so that longitudinal pressure gradients are increased; in cross-section the length of the expanding section of the channel on the back of the blade is reduced as the point of minimum pressure is displaced in the direction of the flow. As will be seen from Fig 2, absolute values of loss factors in blades with channels of this type are reduced and, moreover, the distribution of losses over the height and pitch is more uniform. Graphs showing the relationship between the loss factor of the blading, the height and the angle of inlet are shown in Fig 3 for various kinds of blade. Curves showing the relationship between the loss factor, the ratio of the maximum to the inlet section and the

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height are shown in Fig 4; curves of the relationship between the loss factor, the pitch and the ratio of the maximum to the inlet section are shown in Fig 5. Optimum geometrical parameters for blades of group Ak are given in Table 3. It will be seen from Fig 5 and Table 3 that small variations in the ratio of the maximum to the inlet section do not appreciably affect the losses, the comparatively marked increase in losses at low relative pitch occurs because the channel is of less suitable shape. The influence of flow conditions on the efficiency of class Ak blading may be assessed from the graphs of Fig 6 and Fig 7. Fig 6 shows the influence of inlet angle: it will be seen that although the inlet losses do not vary much with inlet angle ranging from 25 to 35° the losses are less with blades Ak than with blades A. The influence of compressibility and Reynolds number on losses in the two types of blading is shown in Fig 7 and it is shown that compressibility does not have an appreciable

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influence on the losses up to Mach 1. Tests made with blades B and Bk are shown in Fig 7b and it will be seen that at slightly supersonic speeds the presence of an expanding section beyond the inlet has a favourable effect on the losses. It is concluded that in blades where the flow is turned through large angles, the terminal losses may be appreciably reduced by using blades group Ak and Bk with expanding and constricting channels. The simplest way of making these blades is to cut back the concave surfaces of blades A and B which are widely used in turbines. The best amount of expansion of the inlet section depends mainly on the angle through which the flow is turned and the relative height of the blading. Blading of the type described should be used with relative heights less than 2 to 3 and when the flow is turned through angles greater than 120 to 125°. The use of these blades together with guide vanes type Am (having asymmetrical meridional profile) gives appreciable increase in stage

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efficiency of short blades. There are 7 figures, 3 tables and 7 references, 6 of which are Soviet and 1 German.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Institute)

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25667

S/096/61/000/009/004/008
E194/E155

26.2120

AUTHORS: Deych, M.Ye., Doctor of Technical Sciences, and
Filippov, G.A., Engineer

TITLE: On the design of turbine stages with long blades of variable profile

PERIODICAL: Teploenergetika, 1961, No.9, pp. 60-65

TEXT: In gas turbines and more particular condensing steam turbines, the flow parameters in the later stages vary considerably over the height of the blade. It is important to be able to calculate the various parameters accurately, and although a number of methods have been proposed most of them ignore certain important factors. The object of the present work is to refine the determination of the parameters over the height of the blade by taking account of the following three factors: the slope of the blades; the curvature of the line of flow; and the opening-out of the flow path (its expansion in the meridianal plane). In formulating the equations it is also assumed that flow in the guide vane channels is continuous and that changes in the radial components of velocity along the axes are negligible. Then, with

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the notation used in Fig.1 for section 1 - 1, the equation of radial equilibrium assumes the form:

$$\frac{1}{\rho_1}\cdot\frac{dp_1}{dr_1}=\frac{c_{1u}^2}{r_1}-\frac{c_{1z}^2}{R}-c_{1r}\frac{dc_{1r}}{dr_1}-F_r; \qquad (1)$$

$$c_{1u}=\sqrt{\frac{c_1^2}{1+\frac{tg^2\alpha_1}{\cos^2\delta}}}; \quad c_{1z}=\sqrt{\frac{c_1^2\, tg^2\alpha_1}{1+\frac{tg^2\alpha_1}{\cos^2\delta}}};$$

$$c_{1r}=\sqrt{\frac{c_1^2\sin^2\alpha_1\, tg^2\delta}{1+\sin^2\alpha_1\, tg^2\delta}}; \qquad (2)$$

$$F_r=\frac{F_u}{tg(90-\gamma)}=c_z\frac{dc_u}{dz\, tg(90-\gamma)},$$

where: p_1 and ρ_1 are the static pressure and density in the gap; c_{1u}, c_{1z}, c_{1r} are the peripheral axial and radial components of velocity c_1; α_1 is the angle of discharge from the guide vane; δ is the angle of slope of the flow line in the gap; R is the radius of curvature of the flow line in the meridianal plane; F_r, F_u are the radial and peripheral components of force between

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the blades and the flow; γ is the angle of slope of the blades (see Fig.2). On this figure, the inscription on the left reads "discharge edges of blades". It is assumed that change in c_u across the width of the blade B is linear over the centre line of the channel. The law of change of the radius of curvature of the current lines in the gap may be determined approximately in the general case by solution of the equations of continuity written for three sections; before the guide vanes, in the gap, and beyond the stage. It is shown that for turbine stages in which c_{1u} is considerably greater than c_{1z} the influence of the curvature of the flow line is important only when R is equal to or less than r. For compressor stages which are not profiled for constant circulation, the curvature of the flow line may have considerable influence on the distribution of parameters over the blade height. Finally, the following expression is obtained for the reaction:

$$\rho = 1 - (1 - \rho_k)\left(\frac{r_{1k}}{r_1}\right)^{2\cos^2\alpha_1} K_1K_2K_3\left(\frac{\varphi_k}{\varphi}\right)^2 \qquad (16)$$

where $\varphi = c_1/c_{1t}$;

$K_1 = (1 + \sin^2 \alpha_1 \tan^2 \delta)$ is a coefficient which allows for the influence of expansion of the flow path.

$$K_2 = \left(\frac{r_1 + \sqrt{r^2 - r^2}}{r_{1k} + \sqrt{r_{1k}^2 - r_0^2}} \right)^{2 \sin \alpha_1 \cdot \cos \alpha_1 \cdot \frac{r_0}{B}}$$

is a coefficient which allows for the influence of blade slope.

$$K_3 = \exp \left[\sin^2 \alpha_1 \frac{(r_1 - r_{1k})^2}{R_B \ell_1} \right]$$

is a coefficient which allows for curvature of the flow lines.

Fig.3 shows graphs of these three correction factors K_1, K_2 and K_3 from which their influence may be assessed. Formula (16) is based on a number of assumptions and no allowance is made for a number of differences between real and ideal flow. Therefore, it is advisable to introduce into formula (16) an experimental coefficient K so that the equation then assumes the following form:

$$\rho = 1 - (1 - \rho_k) \left(\frac{r_{1k}}{r_1} \right)^{K \cdot 2 \cos^2 \alpha_1 K_1 K_2 K_3} \left(\frac{\varphi_k}{\varphi} \right) \qquad (17)$$

The coefficient K depends on many factors and mainly on the gradient of static pressure along the radius and height of the blade. For long blades K is nearly unity, when $d/\ell > 8$, $K \sim 1.3 - 1.4$, and for stages with d/ℓ less than 8, $K = 1.5-1.7$. Further correction in these values may be required when experimental data are accumulated. Values calculated by formula (17) have been compared with experimental data for certain types of stages with meridianal profiling and sloping edges and it will be seen that agreement is particularly good for stages for which $d/\ell > 8.4$. Another important matter is the correct selection of blade twist. The effectiveness of root and peripheral sections of guide and runner blades of stages with low values of d/ℓ is low. Accordingly it is advisable to select the smallest possible discharge angle α_1 in the blade root and peripheral sections, so as to reduce the flow in these sections. In stages with low values of d/ℓ and high super-critical pressure-drops it is of interest to use blades with sloping discharge edges. However, it is not desirable fully to equalise the reaction over the blade height, because it is then practically impossible to achieve axial flow discharge beyond the stage and so the discharge velocity losses rise.

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On the other hand, large angles of slope cause considerable increase in profile losses and losses in peripheral sections. This point is discussed in relation to certain test results. As the angle of slope of the blades is increased, the difference between the reactions at the blade tip and at the root is much reduced. With the particular stage geometry considered, it falls to zero when $\gamma = 25-30°$. It is concluded that by allowing for the three factors; curvature of the flow lines, expansion of the flow path and slope of the discharge edges; and also by introducing an experimental coefficient into Eq. (17), the accuracy of calculation of stage parameters with long blades is appreciably increased.
There are 6 figures, 1 table and 4 Soviet references.

ASSOCIATION: Moskovskiy energeticheskiy institut
(Moscow Power Engineering Institute)

FILIPPOV, G. A.

Cand Tech Sci - (diss) "Several approaches for increasing the economy of degreed steam and gas turbines." Moscow, 1961. 17 pp; (All-Union Main Board of Energy Administration, All-Union Order of Labor Red Banner Thermotechniques Scientific Research Inst imeni F. E.Dzerzhinskiy); 150 copies; price not given; (KL, 7-61 sup, 248)

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S/114/62/000/001/002/006
26.2122 E194/E455

AUTHORS: Deych, M.Ye., Doctor of Technical Sciences, Professor, Baranov, V.A., Candidate of Technical Sciences, Frolov, V.V., Candidate of Technical Sciences, Filippov, G.A., Engineer

TITLE: The influence of blade height on certain characteristics of single-row turbine stages

PERIODICAL: Energomashinostroyeniye, no.1, 1962, 6-9

TEXT: This article describes work done in the Kafedra parovykh i gazovykh turbin (Steam- and Gas-Turbine Department) of the MEI. The notation used in the article is shown in Fig.1. The stages tested had a mean diameter d_{cp} = 400 mm and the value of the height l_1 ranged from 48 to 10 mm. The clearances had the following values: δ_1, 1.2 to 1.5 mm; δ_2, 3 mm; δ_3, 0.6 to 0.8 mm; δ_4, 1.5 mm. There were no equalizing holes in the disc. The stages were built up by combining a number of different types of runner and nozzle blades so that the effective blade length and other characteristics could be altered. Curves are plotted of stage efficiency and reaction as functions of the velocity ratio of

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The influence of blade height ... S/114/62/000/001/002/006
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u/c_0 for stages having different blade lengths. The influence of blade to nozzle area F_2/F_1 on efficiency and the influence of the enclosed axial clearance δ_2 and of the Reynolds number with different blade lengths are also plotted. It is concluded that meridianal profiling of nozzle blading in stages with a height of 10 to 25 mm gives an appreciable increase in stage efficiency, of the order of 2 to 3%. In stages with this kind of profiling, there is almost no difference between the reaction at the blade tip and that at the blade root. When the blades are short, the efficiency falls off more rapidly than is the case with long blades if the velocity ratio is not of the optimum value, within the range of u/c_0 = 0.4 to 0.58. Other things being equal, the mean stage reaction depends very much on the height of the blades, and it increases as the blades become shorter. When the blades are short the area ratio F_2/F_1 has less influence on the stage efficiency than when they are long. The magnitude of the optimum relative enclosed axial clearance δ_2 diminishes as the blades are shortened. The Reynolds number was found to have an influence on the optimum value of this clearance for stages with short blades.
Card 2/3

39100

S/147/62/000/002/014/020
E191/E535

26.2120

AUTHORS: Gubarev, A.V., Filippov, G.A., Lazarev, L.Ya. and Pand'ya, A.D.

TITLE: A method of design and the results of investigations of a bladeless guiding assembly for radial-axial turbines

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Aviatsionnaya tekhnika, no.2, 1962, 113-123

TEXT: A simplified analysis of the flow rests on the assumptions of an ideal gas, a uniform distribution of the flow parameters in the outlet section of the volute, and the flow parameters at the outlet section of the entry socket being constant in each cross-section of the volute. Analysis of the continuity equation shows the ratio of the inlet and outlet velocities in the volute to be the main parameter which determines the volute geometry. This ratio (the "acceleration factor") also determines whether a bladeless assembly is advisable and when it drops below 0.5, a bladed one is preferable. As the acceleration factor increases, the radius of the volute decreases. Various relations

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are derived and illustrated in graphs between the volute dimensions and the acceleration factor. The model of a bladeless stator for a rotor diameter of 130 mm, a rotor width of 12 mm and a flow angle of 12° at the rotor entry was tested in the laboratory. Energy losses in 16 cross-sections around the periphery were measured together with the flow angles and static pressures. The static pressures were also measured in the entry socket and along the mean volute line. Conclusions: the design procedure put forward permits the determination of the volute geometry and the behaviour of the volute flow under non-design conditions. The flow exit angle from the bladeless assembly depends on the flow velocity even at sub-critical heat transfer conditions. The efficiencies of bladeless and bladed assemblies (with well developed entry sockets) are equal. The volute must be accurately machined to avoid distortion of the velocity field at the turbine inlet. The limits of application of the bladeless stator have not yet been fully explored. There are 9 figures.

ASSOCIATION: Moskovskiy energeticheskiy institut, Kafedra parovykh i gazovykh turbin (Moscow Power Engineering Institute, Department of Steam and Gas Turbines)

SUBMITTED: November 17, 1961

S/096/62/000/003/001/008
E194/E455

AUTHORS: Shcheglyayev, A.V., Corresponding Member of the AS USSR, Deych, M.Ye., Doctor of Technical Sciences, Professor, Filippov, G.A., Candidate of Technical Sciences

TITLE: The design of steam turbine stages, from the results of static blowing tests on rows of blades

PERIODICAL: Teploenergetika, no.3, 1962, 14-18

TEXT: Two methods are in common use for designing the flow paths of steam turbines. One is based on the use of generalized graphs obtained from the tests on stages. With this method the calculations are simple and reliable for the given type of blading, and various generalized graphs have been produced. The second is based on the use of the energy loss factor and flow factors in guide and runner blades, either derived from static tests or calculated from the velocity triangle. This method is also useful, particularly with new types of blade. A wealth of test results is now being obtained on blades in straight bundles, giving both a qualitative view of the flow structure in various kinds of blading and quantitative characteristics for loss, angles and flow factors. An atlas of rational blade profiles has been built up from these tests. Over a number of years, the Kafedra parovykh i gazovykh turbin (Department of Steam and Gas Turbines) of MEI has made studies of flow in turbine blades, using both flat bundles and annular stationary models. Moreover, the blades tested were run in experimental turbines to obtain relationships between efficiency and velocity ratio, using both superheated steam and air. The results so obtained can bridge the gap between the losses determined in static tests and the efficiency of actual stages running on steam. A number of loss curves obtained with various kinds of stage with different kinds of test are plotted and compared, and results are also given for a section of a turbine consisting of three stages. The results lead to the following conclusions. When the design of single-row stages is based on the results of static blowing tests on flat bundles of blades with an irregular velocity distribution and in the presence of overlap, there is satisfactory agreement with tests in experimental turbines in the region of low velocity ratio u/c_0. For optimum values of u/c_0 the divergence between

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test and calculated values is 1.5 to 3%. Generally, a satisfactorily reliable result can be obtained by multiplying the calculated efficiency by a correction factor of 0.98 to 0.97. When calculating the stage efficiency from the loss factors given in the atlas of blade profiles, the correction factor is 0.97 to 0.95 in the zone of optimum velocity ratio. For wheels with two rows of blades the correction factor is 0.97 to 0.95 when the calculations are made from tests carried out with allowance for irregularity of velocity distribution and for overlaps. When the loss factors given in the atlas are used, the correction factor should be 0.95 to 0.92. The least divergence between test and calculated data is obtained in stages with long blades, which indicates that end losses in the blades are not being sufficiently allowed for. Correction factors for relating the result of tests on stages in experimental turbines to calculated values from static blowing tests are valid for stages manufactured with welded diaphragms. The results given in this article are only a first step in relating the results of static tests to total losses determined in an experimental turbine. Further material must be

S/096/62/000/003/001/008
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The design of steam turbine ...

accumulated to improve the reliability of turbine stage calculations. There are 7 figures and 1 table.

Card 4/4

DEYCH, M.Ye., doktor tekhn.nauk, prof.; GUBAREV, A.V., kand.tekhn.nauk;
FILIPPOV, G.A., inzh.; VAN CHZHUN-TSI [Wang Chung-ch'i]

New method for profiling the guiding lattices of stages with low d/l ratio. Teploenergetika 9 no.8:42-47 Ag '62. (MIRA 15:7)

1. Moskovskiy energeticheskiy institut.
(Turbines)

S/114/63/000/002/003/003
E194/E155

AUTHORS: Gubarev, A.V., Candidate of Technical Sciences, Fillippov, G.A., Engineer, and Pand'ya, A.D., Engineer

TITLE: A bladeless guide arrangement for centripetal turbines

PERIODICAL: Energomashinostroyeniye, no.2, 1963, 38-39

TEXT: Centripetal turbines, which are used to give low output combined with high efficiency, currently use bladed guide arrangements which are efficient only with low gas inlet speeds. Helical bladeless swirlers are simpler and smaller. They are based on the principle of accelerating the gas in a centripetal swirl by tangential delivery of the gas to the spiral casing ("scroll"). In designing this arrangement it is necessary to calculate the section of the spiral at a number of positions. Non-viscous uni-dimensional flow is assumed. The following design formulas are derived:

$$q_\varphi F_\varphi = q_1 \pi d_1 \ell_1 \left[\frac{2\pi - \varphi}{2\pi}\right] \sin \alpha_1 \qquad (5)$$

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$$\lambda_{\varphi} r_{\varphi} = \lambda_1 \frac{d_1}{2} \cos \alpha_1 \quad (6)$$

where: q - quantity of gas; F - cross-sectional area of spiral; d - discharge diameter; ℓ - height; α - discharge angle. The suffix 1 relates to discharge conditions; the suffix φ to conditions at an angle φ from inlet. Tests were made on guide equipment designed to these formulas with a discharge diameter of 130 mm and height of 12 mm with $\alpha_1 = 12°$. Losses were plotted for a number of sections and varied considerably over the height of the guide equipment, particularly at low gas speeds. Discharge angles also varied. However, the losses were no greater than in a bladed guide equipment, and bladeless equipment should be used because it is smaller, lighter and easier to make. The design formulas recommended are accurate enough for practical purposes. Some of the variations in discharge angle probably resulted from manufacturing errors in spiral dimensions.
There are 5 figures.

DEYCH, M.Ye., doktor tekhn. nauk; FILIPPOV, G.A., kand. tekhn. nauk;
ABRAMOV, V.I., inzh.

Study of single-crown stages with partial steam supply.
Teploenergetika 10 no.7:16-21 Jl '63. (MIRA 16:7)

1. Moskovskiy energeticheskiy institut.
(Steam turbines) (Gas turbines)

DEYCH, M. Ye., doktor tekhn. nauk, prof.; FILIPPOV, G.A., kand. tekhn. nauk

Study of turbine stages with annular diffusers. Teploenergetika 10 no.10:18-23 O'63 (MIRA 17:7)

1. Moskovskiy energeticheskiy institut.

ACCESSION NR: AP4041175 S/0096/64/000/007/0074/0078

AUTHORS: Deych, M. Ye (Doctor of technical sciences, Professor); Filippov, G. A. (Candidate of technical sciences); Nauman, V. (Engineer)

TITLE: Lemniscate method for constructing profiles of subsonic lattices

SOURCE: Teploenergetika, no. 7, 1964, 74-78

TOPIC TAGS: turbine, turbine lattice, lemniscate profile, turbine blade profile, turbine characteristic, turbine loss, turbine design

ABSTRACT: A method using lemniscate curves for constructing profiles of reactive and active lattices of subsonic turbines was studied because other profiling methods are difficult. New profiles may be constructed from a series of lattices by making small changes in the geometry at the entrance and exit cross sections of two closely similar profiles. Experiments showed that this method produced highly efficient profiles for directional and working lattices over a broad range of entrance and exit angles for subsonic speeds. The lemniscate $(x^2 + y^2)^2 = a^2(x^2 - y^2)$ was found to be most favorable because it permits the choice of

ACCESSION NR: AP4041175

the point of maximum curvature and insures smoothly changing curvatures. Changing the ordinate scale ($y' = k_y y$) shifts the highest point of the profile back along the line x = 0.625a and produces the desired form for any angle of entry and exit. The flow at the concave surface takes place with negative pressure gradients, and the concave surfaces under the negative pressure gradients need be less accurately profiled, so curves other than lemniscate may be used. The profile is considered in three sections: 1) the back of the profile—a straight line in two lemniscate sections; 2) the concave surface—an arc, in part a lemniscate; 3) the entrance and exit sections of the profile—arcs of circles. To construct a profile, the entrance angle α_0 (β_1) and exit angle α_{1ef} (β_{2ef}), the span or width of the profile, and the speed are needed. As an example a ten-step profile construction is presented, with the lemniscate method used for constructing profiles and canals of lattices for an exit angle α_1 (β_2) = 10, 15, 22, 30, and 40° with entrance angle α_0 (β_1) = 20-160°. The change in form of a profile with a fixed entrance angle, α_0 = 90° and with changing exit angles was shown. Four profiles with α_0 = 90° and α_1 = 10, 15, 20, and 40° were tested. The profile losses and

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ACCESSION NR: AP4041175

total losses were found as a function of the Mach number and pressure distributions along the profiles were plotted. A comparison of the new profiles with the best of previously studied and tested ones indicated small losses in the lemniscate lattices for a broad range of exit and entrance angles. With small corrections the lemniscate method may be used for constructing long curved blades. Orig. art. has: 6 figures and 2 tables.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Engineering Institute)

SUBMITTED: 00 ENCL: 00

SUB CODE: PR NO REF SOV: 003 OTHER: 000

Card 3/3

ACCESSION NR: AP4042618 S/0096/64/000/008/0033/0036

AUTHORS: Deych, M. Ye. (Doctor of technical sciences, Professor); Filippov, G. A. (Candidate of technical sciences); Stekol'shchikov, Ye. V. (Engineer)

TITLE: Speed of sound in two-phase media

SOURCE: Teploenergetika, no. 8, 1964, 33-36

TOPIC TAGS: two phase medium, steam water, elastic component, elasticity modulus, speed of sound, polytropic process, mean speed ratio, Stokes flow, water droplet, wave front

ABSTRACT: The propagation of disturbances in a two-phase medium has been studied analytically, and the results are compared to values obtained experimentally. Guck's simplified model of a piston applying a force P on a steam-water system is considered, where the steam represents the elastic component of the mixture with elasticity modulus E or $\frac{P}{F} = E\frac{dS}{dz}$, where dS- distance piston moves in time dt, dz- length of gas set into motion by piston. For a water content of 1-x in the steam an expression is then obtained for the speed of sound in a

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ACCESSION NR: AP4042618

polytropic process of index m, or $a=\sqrt{\frac{m\cdot P}{x\rho\left(1+\frac{1-x}{x}\cdot\frac{c_B}{c_\pi}\right)}}$, where C_B/C_π - mean speed ratio of water droplets and steam, ρ- density of water-steam mixture. Furthermore, a formula is arrived at for the mean speed ratio, using Stoke's flow for the spherical water droplets. This yields

$$\frac{c_B}{(c_\pi)_0}=\frac{\tau_0}{T}\left[e^{-\frac{T}{\tau_0}}+\frac{T}{\tau_0}-1\right],$$

τ_0 - time constant $\tau_0=\frac{2}{9}\frac{\rho_B r^2}{\mu_\pi}$, T - time during which pressure rises or falls at the wave front. The expression for "a" is then compared to the experimental data obtained at the Moscow Institute of Heat Power in the steam-water region $1>x>1-0.75$ and $T = 10^{-4}$ sec. Water droplets had estimated diameters of 10^{-4} to 10^{-3} cm. Measurement accuracy amounted to $\pm$ 1.5% in the magnitude of "a". Although experimental data cover a very small range, they show a good agreement with the values predicted by the expression for "a" above. Orig. art. has: 14 formulas and 5 figures.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Institute of Heat Power)

ACCESSION NR: AP4042618

SUBMITTED: 00 ENCL: 00

SUB CODE: ME,GP NO REF SOV: 004 OTHER: 002

Card 3/3

ACCESSION NR: AP4012338 S/0096/64/000/002/0018/0024

AUTHORS: Deych, M. Ye. (Doctor of technical sciences); Stekol'shchikov, Ye. V. (Engineer); Filippov, G. A. (Candidate of technical sciences)

TITLE: On pressure measuring tubes in pulsating gaseous flows

SOURCE: Teploenergetika, no. 2, 1964, 18-24

TOPIC TAGS: turbulent stream, error analysis, flow oscillation, auxiliary element, pitot tube, total pressure, friction, heat transfer

ABSTRACT: Error sources of pressure measuring tubes in turbulent streams were discussed analytically. The error analysis is represented as the sum of dynamic error ξ_D independent of flow oscillation frequency and geometry of the measuring system, and the dynamic error by ξ_A of auxiliary elements of the pressure measuring device. The latter in turn is divided into three subdivisions: error in the incoming branch of the system ξ_{in}, errors in the main line ξ_m, and errors in the manometer itself. The analysis of ξ_D is illustrated by means of a pitot tube which leads to an expression of the form

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$$\xi_{п.к} = \left[\frac{\bar{p}_0 - \bar{p}_0'}{\left(\rho_\infty \frac{c^2}{2}\right)_p}\right] \cdot 100\%,$$

where $\bar{p}_0$ - total pressure and $\bar{p}_0'$ - mean pitot pressure per period T. The incoming branch error, ξ_{in}, is represented in a similar form where $\bar{p}_0'$ is the stagnation pressure including nonlinear field deformations. The main line error ξ_m is shown to be the sum of losses due to friction, heat transfer and local resistance, normally not accounted for in flow pressure measuring devices. The manometer error is estimated from mass inertia considerations. It is shown that the combined effect of these errors might lead to discrepancies in flow measurements by as much as 200%. Orig. art. has: 33 formulas, 8 figures, and 1 table.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Power Engineering Institute)

SUBMITTED: 00 ENCL: 00

SUB CODE: ME NO REF SOV: 003 OTHER: 000

Card 2/2

DEYCH, M.Ye., doktor tekhn. nauk, prof.; FILIPPOV, G.A., kand. tekhn. nauk; BARANOV, V.A., kand. tekhn. nauk; PRYAKHIN, V.V., inzh.; KUSTOV, O.P., inzh.

Effect of humidity on the efficiency of a bandaged and nonbandaged turbine stage. Energomashinostroenie 10 no.8:21-26 Ag '64.
(MIRA 17:11)

DEYCH, M.Ye., doktor tekhn. nauk, prof.; FILIPPOV, G.A., kand. tekhn. nauk; NAUMAN, V., inzh.

Lemniscate method for constructing the profiles of subsonic lattices. Teploenergetika 11 no.7:74-78 Jl '64. (MIRA 17:8)

1. Moskovskiy energeticheskiy institut.

DEYCH, M.Ye., doktor tekhn. nauk; FILIPPOV, G.A., kand. tekhn. nauk; PRYAKHIN, V.V., inzh.

Calculation of the efficiency of stages operating on wet steam. Teploenergetika 11 no.10:47-50 O '64. (MIRA 18:3)

1. Moskovskiy energeticheskiy institut.

DEYCH, M.Ye., doktor tekhn. nauk; FILIPPOV, G.A., kand. tekhn. nauk; LAZAREV, L.Ya., inzh.; KAZANDZHAN, P.K., doktor tekhn. nauk, prof., retsenzent
[Atlas of the profiles of the cascades of axial-flow turbines] Atlas profilei reshetok osevykh turbin. Moskva, Mashinostroenie, 1965. 96 p. (MIRA 18:2)

PUCHKOVSKIY, V.V., kand. tekhn. nauk; FILIPPOV, G.A., inzh.

Electrical strength of oil gaps with pulsating voltages. Izv. vys. ucheb. zav.; energ. 8 no.1:28-33 Ja '65. (MIRA 18:2)

1. Ivanovskiy energeticheskiy institut imeni V.I. Lenina. Predstavlena kafedroy elektricheskikh setey, sistem i tekhniki vysokikh napryazheniy.

DEYCH, M. Ye., doktor tekhn. nauk, prof.; SHEYNKMAN, A.G., kand. tekhn. nauk; FILIPPOV, G.A., kand. tekhn. nauk; BARANOV, V.A., kand. tekhn. nauk; KIRSANOVA, A.A., inzh.; MIKHAYLOV, B.A., inzh.

Experimental study of a model take-off regulatory stage with a rotary diaphragm. Energomashinostroenie. 11 no.2:14-17 F'65.

(MIRA 18:4)

PUCHKOVSKIY, V.V., kand.tekhn.nauk; KOKORIN, G.I., inzh.; NACHEVA, A.I., inzh.; FILIPPOV, G.A., inzh.

Effect of temperature on the electrical strength of the moist transformer oil. Energetik. 13 no.4:25-27 Ap '65.

(MIRA 18:6)

L 21734-66 EWT(d)/EWT(l)/EWP(m)/EWT(m)/EWP(w)/EWP(v)/T-2/EWP(k)/EWA(h)/ETC(m)-6/EWA(...)
ACC NR: AP6005889 (N) SOURCE CODE: UR/0096/65/000/011/0029/0034
WW/EM

AUTHOR: Filippov, G. A. (Candidate of technical sciences); Pryakhin, V. V. (Engineer)

ORG: Moscow Power Institute (Moskovskii energeticheskii institut)

TITLE: Calculation of the discharge characteristics of nozzle equipment

74
B

SOURCE: Teploenergetika, no. 11, 1965, 29-34

TOPIC TAGS: turbine design, gas discharge, nozzle flow

ABSTRACT: To calculate the discharge of steam or gas through the nozzles and the working grids of a turbine, it is necessary to know the true nature of the flow of the steam or the gas in the channels. The presence of a boundary layer on the contours of the profiles, non-uniformity of the pressure and velocity fields over the cross section of the channel, secondary currents, deviation of the parameters of the steam from equilibrium conditions during expansion of wet steam, and other factors which are difficult to calculate, lead to a deviation of the actual discharge from the theoretical. For this reason in practical calculations, there are introduced discharge coefficients, equal to the

Card 1/2 UDC: 621.165:533.6.001.24

L 21734-66

ACC NR: AP6005889

ratio of the actual to the theoretical discharge, $\mu = G/G_T$. Using these coefficients, the article presents a method of calculating the effect of various geometric and operating parameters, as well as of the moisture content of the steam, on the discharge characteristics of turbine stages. Orig. art. has: 14 formulas and 6 figures.

SUB CODE: 13, 20/ SUBM DATE: none/ ORIG REF: 002

Card 2/2

L 04453-67 EWT(m)/T DJ

ACC NR: AP6014146 (A) SOURCE CODE: UR/0143/65/000/012/0021/0024

AUTHOR: Filippov, G. A. (Engineer); Konovalov, B. Ya. (Engineer); Kosarev, S. B. (Engineer)

22
B

ORG: Ivanovo Power-Engineering Institute imeni V. I. Lenin (Ivanovskiy energeticheskiy institut)

TITLE: Effect of voltage ripple ratio on electric strength of transformer oil

SOURCE: IVUZ. Energetika, no. 12, 1965, 21-24

TOPIC TAGS: transformer oil, power rectifier, voltage ripple ratio

ABSTRACT: The results of an experimental study of the electric strength of transformer oil are reported. Dry transformer oil was humidified or contaminated and its breakdown strength was determined. The dissolved (not emulsified) water caused a very considerable reduction of the electric strength: from 70—80 kv down to about 30 kv for moisture content from 0 to 0.007%. The reduction of the electric

Card 1/2 UDC: 621.315.615.2.015.5

L 04453-67

ACC NR: AP6014146

strength at ac is somewhat less than at dc or ripple voltages. For any constant moisture content, the coefficient k increases with the ripple ratio; $k = U_r / U_{ac}$, where U_r and U_{ac} are the maximum breakdown ripple and a-c voltage, respectively. Also, curves of breakdown voltage vs. ripple ratio for various contaminations of the transformer oil with cellulose fiber are shown. The maximum reduction of the oil electric strength at ripple voltage, as compared to that at ac, was noticed at zero ripple ratio. Orig. art. has: 5 figures and 3 formulas.

SUB CODE: 09 / SUBM DATE: 26Nov64 / ORIG REF: 004 / OTH REF: 002

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L 11339-67 EWT(d)/EWT(m)/EWP(k)/EWP(w)/EWP(v) IJP(c) EM

ACC NR: AP6029863 (N) SOURCE CODE: UR/0096/66/000/009/0074/0078

AUTHOR: Filippov, G. A. (Candidate of technical sciences); Sapozhnikov, V. N. (Engineer; Dissertant)

ORG: MEI-KTZ

TITLE: Investigation of the operation of a group of stages

SOURCE: Teploenergetika, no. 9, 1966, 74-78

TOPIC TAGS: turbine, turbine stage, turbine blade, turbine design

ABSTRACT: The results of investigations carried out on four groups of turbine stages with cylindrical and curved blades with relative heights of 0.3—0.7 are presented. It was found that the efficiency of the turbine flow section between the inlet and exit depends on the conditions of flow transition from one stage to another. The coefficient characterizing the utilization of the exit velocity was approximately equal to 0.86; it decreased sharply at relative velocities of 0.30—0.55. Recommendations for obtaining economical relative velocities and blade cascades as well as formulas for calculating the efficiency of individual turbine stages or blade cascades are given. Orig. art. has: 7 figures, 16 formulas, and 1 table.

SUB CODE: 21 / SUBM DATE: none/ ORIG REF: 004/

UDC: 621.165.533.6.001.5

Card 1/1

FILIPPOV, G. F.

"Moment of Inertia of a System of Interacting Particles.

report presented at the International Conference on Nuclear Reactions, Amsterdam, 2-7 July 1956.

FILIPPOV, G. F.

USSR/Nuclear Physics - Nuclear Reactions. C-5

Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8788

Author : Davydov, A.S., Filippov, G.F.
Inst : Moscow State University.
Title : Concerning the Problem of Scattering Lengths of Slow Neutrons on Deuterons.

Orig Pub : Zh. eksperim. i teor, fiziki, 1956, 31, No 2, 340-341.

Abstract : Scattering of slow neutrons on deuterons is fully determined by two scattering lengths $a_{3/2}$ and $a_{1/2}$ corresponding respectively to two possible spin states of the system. According to the experimental data two variants of the values of the scattering length are possible. A qualitative estimate made by the authors, based on the Pauli principle, favors one of the variants, namely $a_{3/2} = 6.2 \times 10^{-3}$ cm, and $a_{1/2} = 0.8 \times 10^{-3}$ cm.

Card 1/1

FILIPPOV, G. F. and DAVYDOV, A. S.

"Collective Excitation of Even-Even Atomic Nuclei,"

paper submitted at the All-Union Conf. on Nuclear Reactions in Medium and Low Energy Physics, Moscow, 19-27 Nov 57.

Moscow State University

FILIPPOV, G.F.

56-4-24/52

AUTHOR DAVYDOV, A.S., FILIPPOV, G.F.

TITLE Moment of Inertia of a System of Particles in Interaction (Moment inertsii sistemy vzaimodeystvuyushchikh chastits. Russian)

PERIODCIAL Zhurnal Eksperim. i. Teroret. Fiziki, 1957, Vol 32, Nr 4, pp 826 - 836 (U.S.S.R.)

ABSTRACT The paper under review investigates the problem of the cutoff of the collective motions in a system consisting of N particles in interaction with each other.

A system consisting of three particles of equal masses. - In this chapter, the authors investigate three particles without spin and of equal masses m, these particles being in interaction with each other by central forces of any arbitrary kind. By introducing new coordinates, the authors of the paper under review go over to the center-of-mass system. The paper under review follows the computations step by step. For the following magnitudes explicit expressions are given. - potential energy of the system, operator of the total angular momentum of the entire system, Hamilton's operator of the entire system. The operators of the square of the total angular momentum and of its projectum commute with the total Hamiltonian. For this reason, the magnitude corresponding to these operators are integrals of the motion. The system of equations as obtained in the paper under review is then a good approximation, if (a) the three-particles system is symmetrical about an axis

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Moment of Inertia of a System of Particles in Interaction 56-4-24/52

in the system of coordinates connected with these particles, and (b) the ξ-axis of the system is identical with the axis of symmetry. The next chapter deals with a system consisting of three particles of different masses. Here two masses are equal to each other, whereas the third mass is considerably smaller. The third chapter of the paper under review finally is concerned with a system consisting of N Homogeneous particles of equal masses, these particles being in interaction with each other by central forces. The conditions for the decomposition of the total energy of the system into a rotational energy and into an internal energy are indicated in the paper under review. (2 reproductions).

ASSOCIATION Moscow State University
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SUBMITTED 2e March 1956
AVAILABLE Library of Congress

Card 2/2

FILIPPOV, G.F.

56-4-50/52

AUTHOR: DAVYDOV, A.S., FILIPPOV, G.F.

TITLE: The Quadrupole Moments and the Zero Oscillations on the Surface of the Axially-symmetric Nuclei. (Kvadrupol'nyye momenty i nulevyye kolebaniya poverkhnosti aksial'no-simmetricheskikh yader, Russian).

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 4, pp 945 - 947 (U.S.S.R.)

ABSTRACT: For the purpose of simplification the authors here investigate even-even atomic nuclei. In the generalized model of the nucleus the nucleons located outside the nucleus are described by means of the one-particle approximation, and the nucleons within the completely filled-up shells (nucleus trunk) are noticeable only by their collective properties. As collective coordinates the authors here selected the three EULER angles as well as the variables β and γ, which characterize the deviation of the nucleus from the spherical shape. In adiabatic approximation investigation of the motion of the outer nucleons in the field of a nucleus trunk with fixed shape can be carried out. The energy of the interaction of the outer nucleons with the nucleus trunk (which are averaged over the state of motion $\langle H_w \rangle = A\beta\cos\gamma$ of the nucleons) will depend upon the coordinates β and γ, and will play the part of an additional

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The Quadrupole Moments and the Zero Oscillations on the Surface of the Axially-Symmetric Nuclei. 56-4-50/52

energy. This additional energy then determines the shape of the nucleus which corresponds to equilibrium. The quantity A depends upon the number of the outer nucleons and upon their quantum numbers, and can be positive as well as negative. First, an expression for the energy of the nucleus in the generalized model is given. The nuclei apparently are rather stable as to a modification of γ with respect to the values 0 and π, (which correspond to equilibrium) in accordance with the axially symmetric nuclei. Therefore, the authors here investigate only such oscillations as are connected with the modification of β (by the retained values $\gamma = 0, \pi$). The above mentioned formula for energy is now specialized and discussed for these two special cases. A table gives the values of the energy of the surface zero oscillations of a nucleus in the S-state for those states of the outer nucleons which correspond to the values of β_0, for the cases $\gamma = 0$, $\gamma = \pi$. The level $\gamma = \pi$ corresponds to the highest energy, this case corresponds to a special type of degenerated states. (1 table).

ASSOCIATION: Moscow State University.
PRESENTED BY:
SUBMITTED: 26.1.1957
AVAILABLE: Library of Congress
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FILIPPOV, G.F.

56-3-25/59

AUTHORS: Davydov, A.S., Filippov, G.F.

TITLE: Collective Excitation of Even-Even Atomic Nuclei. (Kollektivnyye vozbuzhdeniya chetno-chetnykh atomnykh yader)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 3, pp. 723-729 (USSR)

ABSTRACT: The collective excitation of the levels of axial-symmetrical even-even nuclei is theoretically treated by means of the increased Bohr nuclear model. It is shown that the collective excitation of such nuclei is characterized by 2 types: a) excitation which is accompanied by only a small variation of the nuclear quadrupole moment and b) excitation which is connected with an important variation of the nuclear quadrupole moment. The excitation mentioned at b) occurs especially in the case of nuclei which do not deviate to a great extent from the spherical form. In the case of nuclei deviating to a great extent from the spherical form the form mentioned at b) does not play any role in the case of transitions with small energies variations. For the first 4 - 5 excited states of the nuclei Sn^{116}, Ba^{134}, Pt^{192}, Ge^{72}, Se^{76}, Xe^{128}, Cd^{114}, Pd^{106} the energies of the excited states as well as the inherent spin values are compared to the experimentally found values and in general a good

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Collective Excitation of Even-Even Atomic Nuclei. 56-3-25/59

conformity is found. There are 2 figures, 2 tables, and 3 Slavic references.

ASSOCIATION: Moscow State University (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: March 8, 1957.

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FILIPPOV, G.F.

20-4-17/60

AUTHOR: Filippov, G. F.

TITLE: The First Excited Levels of Axially Symmetrical Even-Even Nuclei. (Pervyye vozbuzhdennyye urovni aksial'no-simmetrichnykh chetno-chetnykh yader).

PERIODICAL: Doklady Akad.Nauk SSSR, 1957, Vol. 115, Nr 4, pp. 696-698 (USSR)

ABSTRACT: The present paper investigates the rotation vibration spectrum of the axially symmetrical nuclei in the approximation of the strong coupling. The conception of the conservation of the axial symmetry is evidently correct for the first excited levels. The Hamilton-function for the free oscillations of the nuclear trunk, resulting from the generalized model, are given. An even number of neutrons and protons lying above the shells changes the expression for the potential energy. The "excess" nucleons deform the trunk. The Schroedinger equation for the deformed nucleus is given. For the function Ψ the author puts $\Psi(\beta,\theta,\varphi)=(u(\beta)/\beta)Y_l^m(\theta,\varphi)$ where l assumes only even-numbered values. The equation(given here) for $u(\beta)$ has an exact solution when $l = 0$. In the case $l \neq 0$ the spectrum can be approximately determined and the equation for the function $u(\beta)$ is reduced to the equations for Hermite-functions. The energy spectrum resulting from this equation is illustrated by a sketch. From the generalized model the correct absolute values of the distances between the energy levels of the nuclei

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could hitherto not be derived. Therefore only the relation of the distances between the levels and the spins of the levels can be compared with the experiment. In order to determine the place of the nucleus in the diagram, the ratio E_2/e_1 was calculated, where E_1 and E_2 signify the energies of the first and the second excited level (starting the calculation with the energy of the ground state). Then the abscissa corresponding to the given value of E_2/E_1 and the sequence of the spins of these levels were determined. The author investigates all heavy and semi-heavy nuclei($A > 70$) whose spectra of the first excited levels are known. In a large group of nuclei the first two excited levels are approximately equidistant and in the case of positive parity have the spin 2. There are 1 figure and 13 references, 4 of which are Slavic.

PRESENTED: March 13, by I.Ye . Tamm, Academician (1957)

SUBMITTED: March 2, 1957

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21 (0)

AUTHORS: Davydov, A. S., Filippov, G. F.

SOV/56-35-2-18/60

TITLE: Rotation States of Nonaxial Nuclei (Vrashchatel'nyye sostoyaniya neaksial'nykh yader)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2, pp 440-447 (USSR)

ABSTRACT: In previous papers by the same authors (Refs 1 - 4) the energy levels of nonspherical nuclei were investigated on the basis of a generalized model of a nucleus according to Bohr and Mottelson (Bor, Mottel'son) (Refs 5 and 6) for collective excitation without disturbing axial symmetry. In the present paper a theory of energy states and of the transitions among them is worked out for nuclei without axial symmetry. It is shown that, though in the case of a disturbance of axial symmetry the rotation spectra in even-even nuclei change only relatively slightly (compared to those of axially symmetric nuclei), new rotation states (with J = 2, 3, 4....) occur. In the case of slight deviations from axial symmetry these levels are considerably higher and are undisturbed; in the case of major deviations from axial symmetry it is found that part of these additional levels is considerably

reduced. Thus, the ratio of two excited levels (1. level - spin = 2) from ∞ to 2. In the second part of this paper the authors investigate the probability of electromagnetic transitions between the rotation levels of non-axially symmetric nuclei. A comparison between theory and experiment shows that the so-called γ-vibrational energy levels of even-even nuclei must be looked upon as rotation levels. The same appears to be true for several nuclei with a spin sequence of 0, 2, 2, 3. There are 1 figure, 3 tables, and 24 references, 6 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: March 17, 1958

DAVYDOV, A. S. and FILIPPOV, G. F.
Moscow State University.

"Rotational States in Even Atomic Nuclei." Nuclear Physics, v. 8, 3 (1958) (North-Hooland Publishing Co., Amsterdam) pp. 237-249.

Abstract: A theory of the energy states and the electromagnetic transisitions between them is developed for nuclei which do not posses axial symmetry. It is shown that violation of axial symmetry does not significantly change the rotational states of axial nuclei and leads to the appearance of new energy states. The reduced probabilities for E2 and M1 transitions between various rotational states are computed.

FILIPPOV, G. F.

FILIPPOV, G. F.

Collective excitation states of even-even atomic nuclei. A. S. Davydov and G. F. Filippov (State Univ., Moscow). *Acta Phys. Acad. Sci. Hung.* 1, No. 1-2, 169-78 (1958) (in Russian).—The collective excitation states of even-even nuclei which have axial symmetry are stud'ed (Ford, C.A. 47, 8524a). It is assumed that the rotational energy is much smaller than the vibrational. The energy ratios of the collective exitations and the succession of spins are computed for various deformation parameters. The energy can be represented as a function of only 2 parameters. The appearance of some special energy states is a consequence of neg. quadrupole moments. The computed values are generally in quant. agreement with exptl. data.

JW

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Distr: 4E3c/4E3d

21(0), 24(5) SOV/56-35-3-21/61

AUTHORS: Davydov, A. S., Filippov, G. F.

TITLE: Magnetic Transitions Between Collective Excited States of Even-Even Nuclei (Magnitnyye perekhody mezhdu kollektivnymi vozbuzhdennymi sostoyaniyami chetno-chetnykh yader)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 3, pp 703-706 (USSR)

ABSTRACT: The present paper is partly based on a previous work (Ref 1) in which the authors calculated the probability for electric quadrupole transitions between rotational states of non-axial even-even nuclei; it was found that a number of energetic states of non-axial nuclei can be well explained by assuming that they refer to rotational states. In the present paper the authors calculate the probability of magnetic dipole transitions between rotational states with the spins 2^+, 2^+. Such levels are observed in the case of the nuclei Se^{76}, Te^{122}, Os^{188}, Os^{186}, Pt^{192} etc. As already shown by reference 1, it is possible, by knowing the ratio between the second 2^+-level and

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the first, to determine the parameter γ and the ratio of the reduced probabilities for transitions. In the present paper the reduced probability of an M1 transition between 2^+, 2^+ states as well as the ratio between this transition and an E2 transition between the same states is calculated. The values obtained agree well with experimental results (Ref 3). For the intensity ratios of magnetic dipole- and electric quadrupole transitions the general formula $T(MJ)/T(E,J+1) \sim \left[25(2J+1)/A^{2/3}(\hbar\omega)_{MeV}\right]^2$ (according to reference 5) applies. For $A \sim 30$ and $\hbar\omega \sim 100$ keV the ratio is $\sim 10^4$, for heavy nuclei at $\hbar\omega \sim 1$ MeV it is ~ 10. For the ratio investigated by the authors the formula $T(M1)/T(E2) = (0{,}03k^2)^{-1} \cdot \frac{B(M1;\ 22-21)}{B(E2;\ 22-21)}$ was derived, where $k = (E_{22} - E_{21})/\hbar c$. For the ratio of reduced transition probabilities (magnetic dipole $\longrightarrow$ electric quadrupole) it holds that $\frac{B(M1;\ 22-21)}{B(E2;\ 22-21)} = \frac{80}{7}\left(\frac{\mu_0 g_R}{eZR_0^2}\right)^2$; it is, therefore, independent of γ and β. (R_0 = nuclear radius)

The numerical results for $\mu_0 = 5{,}05 \cdot 10^{-24}$ erg/G, $g_R = 0{,}4$, and $R_0 = 1{,}2\ A^{1/3} \cdot 10^{-13}$ cm are:

Nucleus	$E_{22}-E_{21}$ [keV]	T(M1)/T(E2)	Percentage of E2 transition (experimental - Ref 3)
Se^{76}	643	$9{,}8 \cdot 10^{-2}$	98 ± 1
Te^{122}	693	$1{,}9 \cdot 10^{-2}$	92 ± 4
Os^{186}	627	$6{,}5 \cdot 10^{-3}$	99 ± 1
Os^{188}	480	$1{,}04 \cdot 10^{-2}$	99,6

There are 1 table and 4 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: April 3, 1958

FILIPPOV, G. F., Cand Phys-Math Sci (diss) -- "Collective excitation of atomic nuclei". Moscow, 1959. 8 pp (Moscow State Order of Lenin and Order of Labor Red Banner U im M. V. Lomonosov), 130 copies (KL, No 9, 1960, 122)

21(1),24(5)

AUTHORS: Davydov, A. S., Filippov, G. F. SOV/56-36-5-30/76

TITLE: On the Problem of the Shape of Even-even Nuclei (K voprosu o forme chetno-chetnykh yader)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, pp 1497-1502 (USSR)

ABSTRACT: In the present very detailed paper a nonspherical nuclear model is investigated. First, the problem of non-sphericity is discussed by way of an introduction and discussed on the basis of the numerous works already published and dealing with this field and phenomena connected with it. Among other things it is shown that the majority of the properties of the first excited states of even-even nuclei may be well explained by the assumption that the nucleus has the shape of a triaxial ellipsoid when in equilibrium (Bohr). The authors investigated the possibility of a deviation of the equilibrium shape of a nucleus from axial symmetry by means of a new method which is based on a generalization of Bohr's method (Ref 2). A model is investigated in which the nucleus consists of a core of several nucleons and 2 equivalent external nucleons in a shell

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On the Problem of the Shape of Even-even Nuclei SOV/56-36-5-30/76

with a certain j-value. According to Bohr the ellipsoidal shape of the nucleus may be characterized by the two parameters β and γ; the authors derive formulas representing nuclear energy as functions of β and γ. The two figures show nuclear energy as a function of γ and l with J = 2 and J = 4 at various l-values. It is shown that in the ground state of the nucleus a nonaxial shape of the nucleus with $j > 3/2$ corresponds to the energy minimum. Several experimental data are given which are in keeping with the authors' theory. There are 2 figures and 10 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: November 20, 1958

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AUTHOR: Filippov, G. F.

TITLE: The Equilibrium Shape of Atomic Nuclei 19

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 4, pp. 1316 - 1319

TEXT: The conception that deformed nuclei have a symmetry axis (generalized model by Bohr-Mottelson) made it possible to give a theoretical description of experimentally observed rotational excitations and to verify various calculations. Recent experimental data concerning rotational spectra have, however, been found to contain anomalies with respect to several nuclei, which cannot be described by introducing simple corrections to a rotational state, which would correspond to an axially symmetric equilibrium shape. If a disturbance of the axial symmetry of the equilibrium shape is assumed, the anomalies appear to be plausible. Thus, the author deems it necessary to re-check the theoretical proofs of the existence of a symmetry axis in deformed nuclei. He first discusses an investigation of the equilibrium shape of a nucleus having one

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83742

The Equilibrium Shape of Atomic Nuclei S/056/60/038/004/035/048
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external nucleon, which was carried out by A. Bohr (Ref. 3). He points out that the energy of the interaction between the external nucleon and the core deformations have been calculated only in first perturbation-theoretical approximation, but that the contributions made by higher approximations must be known for determining the equilibrium shape. Therefore, Bohr's proof of the existence of a symmetry axis in a nucleus with an external nucleon cannot be considered to be fully correct. The attempt is made to determine the equilibrium shape of a nucleus with an external nucleon more exactly on the assumption that the deformations are small. The results obtained lead to the same conclusions as Bohr's calculations. An investigation of many-particle configurations shows that in this case non-axial equilibrium shapes are produced. The author thanks A. S. Davydov for discussions. B. L. Birbrair, L. K. Peker, L. A. Sliv, and B. T. Geylikman and D. A. Zaikin are mentioned. There are 4 figures and 10 references: 5 Soviet, 2 Danish, 2 US, and 1 Dutch.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: November 19, 1959

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S/056/61/040/001/013/037
B102/B204

AUTHORS: Romanov, Yu. A., Filippov, G. F.

TITLE: The interaction between currents of fast electrons and longitudinal plasma waves

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 1, 1961, 123-132

TEXT: The present paper is a consequence of an experimental study by M. D. Gabovich and L. L. Pasechnik (Ref. 1), in which the anomalous electron scattering effects occurring in the interaction of fast electron beam and plasma had been determined. A. A. Vlasov, as well as Bohm and Gross have already attempted to interpret the results obtained by Gabovich and Pasechnik by assuming a modulation of the electron beam. It is, however, a fact that the random fluctuations increased by the electron beam are longitudinal plasma waves. Their group velocity is in the direction of the beam, and in a semi-infinite plasma without any reflecting surfaces, such waves are not able to induce a sufficient modulation of the beam. By explaining the anomalies in the interaction of plasma and electron beam it

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suffices to assume an instability of the electron beam in the plasma. The slight disturbances at the entrance of the beam grow exponentially with the distance from the boundary, and at a distance of about 1 cm, their amplitude is high enough to cause the anomalous scattering of the beam. The theory of the growth of these oscillations has been developed by Yu. L. Klimontovich and Kahn. Above all the results obtained by Klimontovich are utilizing the present paper. The authors here obtain analogous equations of motion as he did, but they have a wider range of application. They hold also if the plasma oscillations are not in thermal equilibrium, and if the electron distribution function deviates from that of Maxwell. In the following, it is possible to obtain equations suitable for analyzing the non-exponential stage of the intensity growth with time of the plasma waves under the action of electron currents of any velocity distribution. It is found on this occasion that with slowing down of the beam strong scattering occurs in the latter, in the course of which electrons with velocities greater or smaller than the mean initial velocity, occur. These equations go over into the aforementioned equations of motion in application to the electron fluxes with large velocity spreads. The accuracy of these equations is checked on a basis of a concrete example. In the equations ob-