

S/169/61/000/011/034/065
D228/D304

3,5800

AUTHOR:

~~Avastin, O. V.~~ A

TITLE:

Absorption of short-wave infra-red radiation

PERIODICAL:

Referativnyy zhurnal, Geofizika, no. 11, 1961, 14,
abstract 11B135 (V sb. Issled. po fiz. atmosfery. 2,
Tartu, 1960, 14 - 22)

TEXT: Contemporary research on the absorption of radiation by the atmosphere in the close infra-red region of the spectrum is reviewed. Quantitative characteristics are given for the absorption of radiation by water vapor and carbon dioxide in the wavelength range from approximately 0.94 μ for the absorption band of water vapor to about 15 μ for the absorption band of carbon dioxide. The question of taking into account the dependence of absorption on the pressure is discussed. 36 references. [Abstractor's note: Complete translation].

Card 1/1

3306C

S/169/61/000/012/060/089
I228/D305

3,5150

AUTHORS:

Shifrin, K. S., and Avaste, O.

TITLE:

Shortwave radiation flows in the cloudless atmosphere

PERIODICAL:

Referativnyy zhurnal, Geofizika, no. 12, 1961, 25, abstract 12B167 (V sb. Issled. po fiz. atmosfery. 2. Tartu, 1960, 23-66)

TEXT: The aim of the work is the construction of a scheme for calculating shortwave radiation flows in the 0.29 - 4 μ spectral region in a layer with a height of up to 30 km. It is a question of calculating "pyranometric" flows at different levels for a cloudless atmosphere. The actual atmosphere is considered as a superimposition of a molecular atmosphere of set composition on an aerosol atmosphere. The following model is taken for the dispersion coefficient on aerosol particles:

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Shortwave radiation...

$b = b_1 + b_2$; $b_1 = b_0 e^{-\beta z}$; $b_2 = \text{const.}$ Two variable parameters-- b_0 and β --may be determined from data about the vertical optical thickness (τ_0) and the horizontal range of visibility. Thus, a closed biparametric model of the actual atmosphere is obtained. In the ozone layer, the weakening of radiation is calculated at an average content of 25 cm. This permits the "subzone" flow irradiating the underlying 20 km layer to be determined. Simple formulas are introduced for calculating the intensity and illumination at different levels. Comparison of the brightness data calculated from the derived formulas with the tables of the Institut fiziki atmosfery (Institute of Physics of the Atmosphere) shows that in the worst case they give an error of about 10% for $\tau_0 = 0.35$. This provided the basis for carrying out detailed calculations of the brightness of atmospheric haze and the distribution of the brightness of the daytime.

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Shortwave radiation...

sky under typical atmospheric conditions. The results of the calculations are adduced in tables. Absorption in the region for H_2O and CO_2 is calculated using the experimental absorption functions of Havard, Birch, and Williams. The intensities of direct solar radiation and of the haze and sky brightness in the infrared region are computed for different levels. Calculations are given for three quantities of precipitated water: 0.5, 2.1, and 3 cm. 50 references. [Abstracter's note: Complete translation.]

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S/023/60/000/003/011/012
C111/C222

AUTHORS: Ross, J., and Avaste, O. ✓

TITLE: Third Soviet Conference on Axonometry, Atmospheric Optics and Meteorology ✓

PERIODICAL: Izvestiya Akademii nauk Estonskoy SSR, Seriya Tekhnicheskikh i Fiziko-Matematicheskikh nauk, 1960, No.3, pp. 272-274.

TEXT: The conference took place from June 27 to July 1, 1960 in Vil'nyus and was subdivided into three sections. The Estonian SSR was represented by a delegation of 9 participants under the leading of J.Ross. The authors mention B.Styra, K.J.Kondrat'yev, J.D.Yanishevskiy, A.I.Voyeykov, J.A.Polyakova, G.V.Rozenberg (Moscow), Ye.M.Feigel'son, M.S.Malkevich, O.A.Germogenova, H.Nilisk, O.Avaste, L.B.Krasil'shchikov (Leningrad), J.Reemann (Tartu), H.Toomong, K.S.Shifrin (Leningrad), V.I.Kuznetsov (Leningrad) and A.A.Dimitriyev (Moscow).

Card 1/1

S/049/60/000/03/018/019
E131/E691

AUTHORS: Avaste, O.A. and Atroshenko, V.S.

TITLE: On the Accuracy of V.V. Sobolev's Method

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya geofizicheskaya, 1960, Nr 3,
pp 507-509 (USSR)

ABSTRACT: V.V. Sobolev's method (Ref 1) is used to obtain an approximate solution of the radiation transfer equation in an anisotropic scattering atmosphere. The present note represents an attempt to estimate the errors involved in this method by comparing the data reported by Feygel'son et al. (Ref 2) with calculations by the Sobolev method (in Ref 2 the radiation transfer equation was solved numerically by a successive approximation method). Sobolev (Ref 3) showed that in a single-layer model of the atmosphere the approximate formulas involve an error not exceeding 10%. He did not, however, indicate the optical thicknesses, the forms of the scattering functions etc. to which this figure applies. It is, therefore,

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On the Accuracy of V.V. Sobolev's Method

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interesting to have some estimate of the Sobolev method under different physical conditions. The present authors have determined the intensity of scattered light by the Sobolev method, assuming that the scattering medium consists of two parallel layers and the scattering indicatrix is independent of altitude for each of the layers. The numerical results obtained indicate that the errors involved can considerably exceed the figure of 10% quoted by Sobolev. Acknowledgment is made to M.S. Malkovich for advice. There are 3 tables and 5 references, 4 of which are Soviet; and 1 German.

ASSOCIATION: Akademiya nauk SSSR, institut fiziki atmosfery. Akademiya nauk Estonskoy SSR, institut fiziki i astronomii. (Academy of Sciences USSR, Institute of Physics of the Atmosphere and Academy of Sciences Estonian SSR, Institute of Physics and Astronomy)

SUBMITTED: August 1, 1959

Card 2/2

SHIFRIN, K. S., and AVASTE, O. A.

"The Field of Short-wave Radiation in Case of a Clear Sky."

report submitted in connection with the Symposium on Radiation
Vienna, Austria, 14-19 Aug 1961

(paper read by V. G. Fesenkov)

AVASTE, O.; ROSS, J.

All-Union Meteorological Conference. Eesti tead akad tehn fuus
no.3:260-261. '61.

AVASTE, O.A.

Accuracy of the approximate formula for the calculation of the oblique
visual range. Trudy GGO no.109:3-12 '61. (MIRA 14:5)
(Visibility)

AVASTE, O.A.

Luminance of dry haze in a many-layered atmosphere. Trudy GGO
no.109:13-24 '61. (MIRA 14:5)

(Meteorological optics)

AVASTE, C. A.

Cand Phys-Math Sci - (diss) "Field of shortwave radiation in a cloud-free atmosphere." Tartu, 1961. 10 pp; (Academy of Sciences Estonian SSR, Inst of Physics and Atmosphere); 300 copies; free; (KL, 7-61 sup, 217)

3,5150

37302
S/169/62/000/004/032/103
D228/D302

AUTHOR: Avaste, O. A.

TITLE: The accuracy of an approximate method for calculating the brightness of atmospheric haze

PERIODICAL: Referativnyy zhurnal, Geofizika, no. 4, 1962, 23, abstract 4B155 (V sb. Aktinometriya i atmosf. optika, L., Gidrometeoizdat, 1961, 270-282)

TEXT: The author estimated the accuracy of the approximate method, proposed by V. V. Sobolev, for calculating the atmospheric haze brightness by comparing the computations from this method with the tables of the Institut fiziki atmosfery (Institute of Atmospheric Physics), obtained by means of the numerical estimation of haze. A two-layer model of the actual atmosphere, with L. Foytsik's and Kh. Tsshayek's indicatrices of scattering, is studied. It is shown that for a not too elongated indicatrix the error in Sobolev's method is less than 10% when τ , the optical thickness of the atmosphere, is less than 0.35. When taking only single dispersion into

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The accuracy of ...

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account, the relative errors in the determination of the scattered intensity grow as the atmosphere's optical thickness increases and are maximal at scattering angles close to 90° . In computing the ascending current intensity the maximum errors in Sobolev's method are much less than in calculating the descending-current intensities. Sobolev's method gives a diminished value at low angles of scattering close to 90° . When calculating the descending radiation, this method's errors are greatest at scattering angles close to 90° ; they also grow with the increase in the indicatrix elongation and the atmosphere's optical thickness. / Abstracter's note: Complete translation. /

Card 2/2

8/911/62/003/000/016/033
D403/D301

AUTHOR:

Avaste, O.A.

TITLE:

Approximate solution of radiation-transfer problem in the case of anisotropic scattering. (Summary of paper)

SOURCE:

Akademiya nauk Kazakhskoy SSR. Astrofizicheskiy institut. Trudy. v. 3. 1962. Rasseyaniye i polarizatsiya sveta v zemnoy atmosfere; materialy Soveshhaniya po rasseyaniyu i polarizatsii sveta v atmosfere. 103

TEXT:

In V.V. Sobolev's approximate method the multiply-scattered radiation is represented by two terms of the scattering-function expansion in Legendre polynomials; the dependence of the intensity of the multiply-scattered radiation on the azimuth is disregarded. A plane-parallel anisotropically scattering atmosphere of finite optical thickness is considered. For small zenith angles ($\theta < 45^\circ$), V.V. Sobolev's approximate formula for the diffuse

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Approximate solution of ...

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radiation flux yields an accuracy of 10% even in the case of strongly anisotropic scattering functions and high optical thickness (up to $\tau_0 = 0.8$). The error of the approximate formula for diffuse radiation fluxes F_D increases with the anisotropy of the scattering function, the optical thickness and the zenith angle of the Sun; for $\tau_0 = 0.8$, a strongly anisotropic function, and a zenith angle of 75° , the error is 40%. Sobolev's method is refined by separating the second-order scattering with allowance for the dependence of its intensity on azimuth. The multiple scattering is taken into account by means of spherical scattering functions. The accuracy of the method of calculation of the fluxes is estimated by means of the numerical solutions of the radiation-transfer equations (Ref. 1: Ye.M. Feygel'son, M.S. Malkevich et al., Trudy IFA AS SSSR, no. 1, part 1, 1958). The paper will be published in Ref. 2 (O. Avaste, Issledovaniya po fizike atmosfery IFA AS Estonian SSR, no. 3, 1962).
[Abstractor's note: Complete translation.]

Card 2/2

S/269/63/000/003/008/036
A001/A101

AUTHORS: Avaste, O., Moldau, Kh., Shifrin, K. S.

TITLE: The spectral distribution of direct and scattered radiation

PERIODICAL: Referativnyy zhurnal, Astronomiya, no. 3, 1963, 27, abstract
3.51.221 (In collection: "Issled. po fiz. atmosfery", 3, Tartu,
1962, 23 - 71, English summary)

TEXT: The authors present the results of calculations of spectral distribution of direct solar and scattered radiations at various atmospheric turbidities, taking into account absorption by vapor, carbon dioxide, and ozone. Calculations for the standard radiation model of the atmosphere agree well with average experimental data. An approximate formula is proposed for taking into account the effect of albedo on descending flux of scattered radiation in the case of true absorption. It is shown that the observed extension of atmospheric scattering indicatrix with increasing wavelength follows directly from the model by K. S. Shifrin and I. N. Minin. There are 25 references.

Authors' summary

[Abstracter's note: Complete translation]

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S/269/63/000/003/009/036
A001/A101

AUTHOR: Avaste, O.

TITLE: On an approximate solution of the radiative transfer problem at anisotropic scattering

PERIODICAL: Referativnyy zhurnal, Astronomiya, no. 3, 1963, 28, abstract 3.51.229 (In collection: "Issled. po fiz. atmosfery", 3. Tartu, 1962, 72 - 84, English summary)

TEXT: The author specifies the approximate method of solving transfer equations for a plane-parallel plainly scattering atmosphere of finite optical thickness, proposed by V. V. Sobolev (Astron. zh., 1943, v. 20, 14). Double scattering is singled out with taking into account the azimuth-dependence of intensity. Multiple scattering is taken into account by means of spherical indicatrix. Formulae are derived for descending fluxes of scattered radiation in the cases of one-layer and two-layer atmospheres. The results of calculations by the formulae obtained are compared with those calculated by V. V. Sobolev's formulae and by the method of successive approximations. Corresponding tables

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and graphs are presented. There are 11 references.

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A001/A101

V. Loskutov

[Abstracter's note: Complete translation]

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L 14584-66 EWT(1) GW

ACC NR: AT6002611

SOURCE CODE: UR/3112/64/000/006/0005/0053

AUTHOR: Avaste, O.; Mullamaa, Yu.; Shifrin, K. S.

ORG: Shifrin Main Geophysical Observatory im. A. I. Veyeykov (Glavnaya geofizicheskaya observatoriya)

TITLE: The field of outgoing short wave radiation in the visible and near infrared spectral regions for the case of a nonorthotropic underlying surface

SOURCE: AN EstSSR. Institut fiziki i astronomii. Issledovaniya po fizike atmosfery, no. 6, 1964, 5-53

TOPIC TAGS: IR radiation, radiation intensity, solar radiation, meteorology, *ATMOSPHERIC RADIATION*

ABSTRACT: The authors analyze the spatial distribution of reflected radiation intensity in the visible and near infrared spectral regions just above the surface of the sea and at the extreme limit of the atmosphere. The surface of the sea is assumed to be made up of elementary areas whose normals are spatially distributed according to a definite law. A standard plane-parallel atmospheric model is considered. Isophotic maps are plotted for the outgoing radiation as a function of the solar zenith angle and wind velocity and direction. The form of the isophots is

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strongly dependent on these parameters. Calculations show that the albedo of the reflected solar radiation is only slightly dependent on these parameters at a zenith angle of less than 60° . When the solar zenith angle is greater than 60° , the albedo of the solar radiation increases with the zenith angle, showing a faster increase at low wind velocities. In the visible region of the spectrum, radiation scattered by the atmosphere makes a considerable contribution to the outgoing radiation even in the direction of the sun's glitter pattern. There is a considerable change in the shape of the isophots in the water vapor absorption bands. At solar zenith angles greater than 60° , the maximum intensity of the glitter pattern exceeds the intensity of the outgoing radiation at the nadir in the visible region of the spectrum by a factor of 10, in the near infrared region by 50 times and in the spectral region from 0.4 to 4μ by a factor of 14. At a zenith angle of 60° , the coefficient of reflection from the surface of the sea in the area of the glitter pattern exceeds the coefficient of reflection at the nadir by a factor of 1,000. The authors are sincerely grateful to V. Kh. Tim for programming the problem on the computer and for carrying out the calculations and to V. Yu. Kolomiytsev for discussing this work. Orig. art. has: 14 figures, 8 tables, 60 formulas.

SUB CODE: 08/ SUBM DATE: 22Jun64/ ORIG REF: 026/ OTH REF: 022

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L 52627-65 EWT(1), EWG(v) re-5/Pae 2 GS/GW

ACCESSION NR: AT501135

UR/0000/64/000/000/0034/0010

AUTHOR: Avastin, O. A.

TITLE: Intensity of fluxes of radiation from a spherical earth in the near infrared spectral range

SOURCE: Mazhva, domstvennoye soveshchaniye po aktinometrii i optike atmosfery. 54, Moscow, 1963. Aktinometriya i optika atmosfery (actinometry and atmospheric optics); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 34-40

TOPIC TAGS: shortwave radiation, optical depth, air molecule, aerosol, scattered light, albedo, indicatrix, incidence angle

ABSTRACT: The scattering and absorption of shortwave radiation takes place in a thin atmospheric layer which stretches from 0 to 30 km. The optical depth in the infrared range of the atmosphere is less than 0.1. The concentration of water vapor in this layer diminishes with height, following the exponential law, and the radiation is scattered on air molecules and aerosols. A mathematical equation is composed expressing the intensity of scattered light above 30 km. The scattered infrared radiation is compared with the reflected radiation when the albedo is more than 0.1. The distribution of flux intensities depends upon the incidence angle, the indicatrix

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of the scattering, and the optical depth provided the surface albedo is zero. Computation results showed that the flux intensity decreases with increasing optical depth during a cloudless sky. Fluxes decrease in the absorption belts with increasing water vapor, and they gradually decrease as the incident angle increases. Flux intensities reflected from the upper limit of the atmosphere are 1.4 times as great as those reflected from snow. Orig. art. has: 2 figures and 13 formulas.

[EG]

ASSOCIATION: Institut fiziki i astronomii AN EstSR, Tartu (Institute of Physics and Astronomy, AN EstSR)

SUBMITTED: 25Nov64

ENCL: 00

SUB CODE: AA

NO REF SOV: 006

OTHER: 009

ATD PRESS: 4010

182
Card 2/2

AVASTH, G.S.

Method for calculating the intensities and fluxes of heating radiation for the spherical earth in the near infrared region of the spectrum. Trudy GGO no.100:244-151-107.

Results of calculating the intensities and fluxes of heating radiation for the spherical earth in the near infrared region of the spectrum. Ibid.:143-107

(S. 107-111)

MULLAMAA, Yulo-Ants Ruttarovich [Mullamaa, Ulo-Ants]; AVASTE, O.A.,
otv. red.

[Atlas of the optical characteristics of a disturbed
sea surface] Atlas opticheskikh kharakteristik vzvolno-
vannoi poverkhnosti moria. Tartu, AN Estonskoi SSR,
Inst fiziki i astronomii, 1964. 110 p., 384 p.
(MIRA 18:1)

AVASTE, O.; ROSS, J.

International symposium on the study of atmospheric radiation
processes. Izv. AN Est. SSR. Ser. fiz.-mat. i tekhn. nauk no.4:
428-430 '64. (MIRA 18:4)

T. 12108-66 EWT(1)/FCC CW

ACC-NRR AF6022227

SOURCE CODE: UR/0362/66/002/006/0672/0676

AUTHOR: Villmann, Ch. I.; Avaste, O. A.

83
59
B

ORG: none

TITLE: Noctilucent cloud symposium

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 6, 1966, 672-676

TOPIC TAGS: meteorologic conference, atmospheric cloud, cloud level, atmospheric ion, atmospheric optic phenomenon, atmospheric moisture, cloud formation, cosmic dust, atmospheric scatter, atmospheric temperature gradient, atmospheric radiation, spaceborne atmospheric observation

ABSTRACT: An international symposium on noctilucent clouds was held in Tallin from 15 to 18 March 1966 under the auspices of the International Association of Atmospheric Meteorology and Physics, the World Meteorological Organization, and a special committee of IQSY. Soviet participants read the following papers:

Speaking on the climatology of noctilucent clouds, Ch. I. Villmann proposed the establishment of an international noctilucent cloud patrol network similar to that already existing in the Soviet Union. IQSY data on noctilucent clouds obtained in the USSR have shown that the maximum frequency of occurrence is in July. Data on the height characteristics

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UDC: 551.576.1:551.593.653

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of noctilucent clouds over Estonia obtained by stereophotogrammetry, M. I. Burov reported, have shown that 1) the height of the clouds varies from 65 to 95 km, and 2) height readings varying by about 13 km were recorded for a single instance of cloud occurrence.

I. A. Khvostikov and I. M. Kravchenko examined the processes that increase the concentrations of H_2O molecules in the mesosphere. They further discussed the mechanism of the so-called "solar rain" and the rate of hydrogen accretion during the interaction of the solar wind plasma with the terrestrial magnetosphere. In effect, they computed the rate of H_2O molecule formation in the upper layers of the atmosphere from hydrogen of solar origin.

N. N. Shefov showed that in the noctilucent cloud zone the intensity of the hydroxyl OH emission bands increases at about twice the normal rate while noctilucent clouds are developing. On the night following the appearance of the noctilucent clouds the OH emission decreases 2—3 times below its average value, and then returns again to its previous level. This effect is a quantitative indicator of the variation of the chemical composition of the atmosphere at heights of about 80 km, as well as of the rate of vertical mixing in these layers.

K. Ya. Kondrat'yev, I. Ya. Badinov, S. D. Andreyev, V. B. Lipatov, and V. N. Konashenko discussed the results of optical and condensation

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measurements of moisture in the stratosphere. Spectroscopic investigations conducted in 1964—1965 by spectrophotometric balloon lofted to heights of 30—32 km, have confirmed that the stratosphere is comparatively dry — the mixture ratio is $10^{-6}/5 \cdot 10^{-6}$ g/g. The authors note that many investigators who detect high moisture values in the stratosphere have introduced substantial errors in their experiments by not taking into account the water vapor adsorbed on the walls of the spectrometers. The authors theoretically analyzed the possible stratification of water vapor between 30 and 100 km, taking into consideration the photochemistry and the general circulation of the atmosphere. Their work shows that at heights of 70—90 km there are sufficient concentrations of water vapor to concentrate and form noctilucent clouds.

V. G. Fesenkov noted that on the basis of measurements of the brightness of twilight at symmetrical points of the solar vertical in cases of large angles of solar depression it is possible to study the distribution of cosmic dust and the optical thickness of the layers in which noctilucent clouds occur. This contention was confirmed by observations made in the Astrophysical Observatory of the Kazakh Academy of Sciences.

Using theoretical works, the results of aircraft observations, searchlight sounding data, and measurements of the brightness of the twilight sky obtained from ground observations and observations made in the Vostok spaceship and Vostok-6, G. V. Rozenberg, A. B. Sandomirskiy,

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and V. K. Pyldma examined the height distribution of the aerosol coefficient of scattering in the real atmosphere at different wavelengths. These methods permitted the study of aerosols in the 2—200-km height interval, where the coefficient of scattering changes by three orders of magnitude. Observations at different geographic points and in different seasons confirm that very often the maximum of aerosol concentration is at heights of 15—22 km, while the minimum of turbidity is at heights of 25—30 km. The results of the different experimental investigations agree. It is found that the turbidity of the air in layers higher than 30 km is relatively great and that the coefficient of scattering there in the blue spectral region is double the molecular coefficient of scattering. In the red spectral region this ratio reaches 6—7:1. Rozenberg and others have noted that aerosol layers are often encountered at heights of 42—44 km and near 70 km.

A. V. Fedynskiy discussed the results of instrument measurements of water vapor concentrations in the mesosphere made by rockets at heights from 68 to 95 km. The measurement device worked on the principle of measuring the heat emission from a heated filament in the presence of water vapor. According to the data obtained, the water vapor is distributed in a layer 13--14 km thick. The water vapor tension at 79 km was of the order of $3 \cdot 10^{-5}$ mm Hg. Experiment error was put at 40%.

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N. I. Grishin examined the morphological structure of noctilucent clouds, which is determined by the thermodynamic processes in the mesosphere and mesopause. Time-lapse photography introduced in 1953 has revealed the wave-like nature of the clouds as well as other dynamic characteristics. Two noctilucent cloud layers moving in different directions and having different morphological structures have been identified on the basis of such photographic material.

B. N. Trubnikov and I. S. Skuratova reported on the distribution of moisture in the noctilucent cloud zone as an indicator of instability with respect to the wet adiabatic temperature gradient. Since the temperature gradient at these heights exceeds the wet adiabatic gradient, convective movements are observed. Rayleigh-Chandrasekhar convection equations were also examined.

A. I. Ivanovskiy analyzed the dispersion equation obtained from a system of hydrodynamics equations taking into account radiation absorption and heat radiation of the atmosphere. This investigator showed that gravitational waves can be self-generated during radiation cooling of the atmosphere. L. P. Zhukova and B. N. Trubnikov discussed the penetration of gravitational waves from the troposphere into the stratomesosphere and

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ACC NR: AP602227

quantitatively investigated the hypothesized formation of a mesostructure of the noctilucent cloud field due to the gravitational waves. The symposium represented the first international geophysical undertaking since IQSY. Tartu hopes to coordinate worldwide research on noctilucent clouds. [ATD PRESS: 5027-F]

SUB CODE: 04, 05 / SUBM DATE: none

Card 6/6 ^{sf}

RAKOV, Vitaliy Aleksandrovich; AVATKOV, A.S., inzhener, redaktor; VERINA,
G.P., tekhnicheskii redaktor

[Railroad locomotives of the Soviet Union; from the first railway
engines to modern locomotives] Lokomotivy zheleznykh dorog
Sovetskogo Soiuza; ot pervykh parovozov do sovremennykh lokomo-
tivov. Moskva, Gos.transp. zhel-dor. izd-vo, 1955. 455 p.
(Locomotives) (MIRA 9:3)

AVATKOV, Aleksandr Stepanovich; VISLOUKH, L.A., inzh., red.; YERINA, G.P., tekhn. red.

[Electrification of railroads using single-phase currents of industrial frequency] Elektrifikatsiya zheleznykh dorog na odnofaznom toke promyshlennoi chastoty. Moskva, Gos. transp. zhel-dor. izd-vo, 1958. 294 p. (MIRA 11:10)

(Electric railroads)

AVATKOV, A.S., inzh.

Development of electric traction and electric locomotive manu-
facture abroad. Elek. i tepl. tiaga 2 no.10:44-48 0 '58.
(MIRA 11:11)

(Electric railroads)

AVATKOV, A.S., inzh.; PETROVSKIY, A.V., inzh.

Handbook on electric rolling stock ("Technical handbook for railroad workers. Vol. 9, Electric railroad rolling stock." Reviewed by A.S. Avatkov, A.V. Petrovskii). Zhel. dor. transp. 40 no.3:94-96
Mr '58. (MIRA 11:4)
(Electric railroads--Rolling stock)

AVATKOV, A.S., inzh.; BELOKHEV'LIN, Yu.F., inzh.

Use of semiconductor rectifiers in traction substations. Zhel.
dor.transp. 41 no.8:31-33 Ag '59. (MIRA 12:12)
(Electric railroads--Substations)
(Electric current rectifiers)

AVATKOV, A.S., insh.; SOROKIN, G.Ye., insh.

The world's railroads ("Railroads." Reviewed by A.S.Avatkov,
G.Ye.Sorokin). Zhel.dor.transp. 42 no.4:95-96
Ap '60. (MIRA 13:7)
(Railroads)

AVATKOV, A.S., inzh.; DUBROVSKIY, Z.M., inzh.

"The a.c. electric locomotives" by V.A.Rakov. Reviewed by A.S.
Avatkov, Z.M.Dubrovskii. Zhel.dor.transp. 44 no.6:95-96 Je
'62. (MIRA 15:8)
(Electric locomotives) (Rakov, V.A.)

AVATKOV, Aleksandr Stepanovich; KHLEBNIKOV, V.N., kand. tekhn.
nauk, retsentsent; ZUBLEVSKIY, S.M., inzh. red.;
MEDVEDEVA, M.A., tekhn. red.

[A.C. locomotives and motor coaches] Elektrovozy i motor-
nye vagony peremennogo toka. Moskva, Transzheldorizdat,
1963. 237 p. (MIRA 17:1)

AVATKOV, Ye.S., inzhener.

One engineer in the cabin of electric locomotives. Elek. 1
tepl. tiaga no.2:44-45 F '57. (MLRA 10:5)
(Europe, Western--Electric locomotives)

AVATKOV, Ye.S., inzhener.

Device for lessening wear of wheel flanges of locomotive wheel
pairs. Elek. i topl. tiaga no.3:45-46 Mr '57. (MLRA 10:6)
(Europe, Western--Car wheels)

AVATKOV, Ye.S., dotsent.

Atomic locomotives. Zhel.dor. transp. 40 no.1:61-65 Ja '58.
(MIRA 11:1)

(Atomic locomotives)

AVAYEV, A.

Spring care of forest belts Kolkh. proizv. 12 no. 4, April 1952

SO: MLRA, August 1952.

TSYLIN, B.F.; AVAYEV, A.M.

Repairing the parts of metal cutters using "Stirakril."
Mash. i nef. obor. no.4:30-31 '64. (MIRA 17:6)

1. Kubyshevskiy golotnyy zavod.

AVAYEV, M. S.

36290 Akademi V. B. Vilyams-voinstvuyushiy materialist--dialektik sov. agronomiya
1949, No. 11, S. 37-43, s. portr

SO: Ietopis' Zhurnal'nykh Statey, No. 49, 1949

1. AVAYEV, M. G.
2. USSR (600)
4. Irrigation - Volga-Don canal region
7. Transformation of nature in the district of the Lenin Volga-Don Navigation Canal.
Est. v. shkole, No.6 1952.

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

AVAYEV V. G.

Zhizn' pochvy (Life of the soil) Moskva, Goskul'tprosvetizdat, 1953. 54 p.
(Bibliotekha "V pomoshch' lektoru," no. 23)

SO: Monthly List of Russian Accessions, Vol. 7, No. 7, Oct. 1954

AVAYEV, M.G., kandidat sel'skokhozyystvennykh nauk.

Virgin and waste lands should be put to use for service to socialist society. Est. v shkole no.3:8-16 My-Je '54. (MIRA 7:7)

1. Moskovskaya sel'skokhozyystvennaya akademiya imeni K.A. Timiryazeva.

(Reclamation of land)

AVAYEV, M.G.

[Principles of agriculture; explanatory text to accompany study charts] Osnovy zemledel'ia; ob"iasnitel'nyi tekst k serii uchebnykh tablits. Izd. 2., perer. i dop. Moskva, Ministerstvo prosveshcheniia RSFSR, 1955. 43 p.

(Agriculture)

(MIRA 11:10)

AVAEV, M. G.

USSR/Soil Science. Physical and Chemical Properties of Soils.

I-3

Abs Jour: Referat Zh-Biol., No 6, 25 March, 1957, 22449

Author : Avaev, M.G.

Inst :

Title : Soil and Its Agronomical Properties.

Orig Pub: Estestvozn. v shkole, 1956, No 1, 48-54

Abstract: The simplest methods of field determination of soils, their mechanical composition, structure, humidity, and humus content are stated.

Card : 1/1

-10-

AYAYEV, M.G., kandidat sel'skokhozyaystvennykh nauk.

Spring tillage. Tillage equipment: the plow and cultivator. Est. v
shkole no.4:65-70 JI-Ag '56. (MIRA 9:9)

1. Moskovskaya sel'skokhozyaystvennaya akademiya imeni K.A. Timiryazeva.
(Tillage) (Agricultural machinery)

AVAYEV, Mikhail Grigor'yevich; KAPLAN, G.D., red.; PAVLOVA, M.M., tekhn.
red.

[Principles of crop cultivation with soil science] Osnovy zemledelias
s pochvedeniem. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1957.
326 p. (MIRA 11:4)

(Agriculture)

AVAYEV, N.G., kand. sel'skokhozyaystvennykh nauk

"Entertaining: agronomy" by A.G. Doiarenko. Reviewed by N.G. Avayev.
Biol. v shkole no.2:93-95 Mr-Apr '58. (MIRA 11:4)

1. Moskovskaya sel'skokhozyaystvennaya Akademiya imeni K.A. Timiryazeva.
(Agriculture) (Doiarenko, A.G.)

CHIZHEVSKIY, Mikhail Grigor'yevich, prof., doktor sel'skokhoz.nauk;
AYAYEV, M.G., dotsent; ZHELTIKOV, S.A., dotsent; KISELEV, A.N.,
dotsent; PETERBURGSKIY, A.V., prof.; GROKHOVSKIY, M.I., dotsent;
OZEROV, V.N., red.; BACHURINA, A.M., tekhn.red.; BALLOD, A.I.,
tekhn.red.

[Agriculture with principles of soil science] Zemledelie s osno-
vani pochvedeniia. Pod red. M.G.Chizhevskogo. Izd.2., perer.
Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 431 p.

(MIRA 13:?)

(Agriculture)

(Soils)

AVAYEV, M.G., kand. sel'skokhoz. nauk

Microbes and soil fertility. Biol. v shkole no.4:83-89 J1-Ag '59.
(MIRA 12:11)

1. Moskovskaya sel'skokhozyaystvennaya akademiya imeni K.A.
Timiryazeva.

(Soil micro-organisms) (Soil fertility)

VOROB'YEV, Sergey Andreyevich, doktor sel'khoz. nauk, prof.; AVAYEV, Mikhail Grigor'yevich, kand. sel'khoz. nauk, dotsent; CHELYSHKIN, Yu.G., red.; DEYEVA, V.M., tekhn. red.

[Practical and laboratory work in soil science and agriculture] Laboratorno-prakticheskie zaniatia po pochvovedeniiu i zemledeliiu. Izd.2., perer. Moskva, Gos. izd-vo sel'khoz.lit-ry, zhurnalov i plakatov, 1961. 335 p.

(Soils)

(Agriculture)

(MIRA 14:7)

AVAYEV, Mikhail Grigor'yevich; GOLIKOV, A.F., nauchn. red.;
BARANOV, M.F., red.

[Fundamentals of farming with soil science] Osnovy zemle-
deliia s pochvovedeniem. Moskva, Vysshaia shkola, 1964.
246 p. (MIRA 17:12)

AVAYEV, S.A., ENGINEER

CAND TECH SCI

Dissertation: "Drying Raw and Finished Flax Yarn in a High Frequency Electric Field."

28 April 49

Moscow Textile Inst.

SO Vecheryaya Moskva
Sum 71

AVAYEV, S. A.

(Electrical equipment for light industry enterprises) Moskva, Gos. nauchno-tekhn.
izd-vo legkoi promyshi., 1951

SO: MLRA. July 1952.

AVAYEV, S. A.

USSR/Electricity - Heating Jun 53

"At the Section on Electric Heating of the Moscow Branch of VNIIOE and the House of Engineers and Technicians imeni Dzerzhinskiy," A.V. Netushil, S.A. Avayev; Cands Tech Sci

Elektrichestvo, No 6, pp 86-87

Lists, briefly treats contents of 10 out of 12 papers delivered and discussed at subsection on heating of dielects and semiconductors at Section of Elec Heating of MOWITOE /Moscow Branch of VNIIOE/ and House of Engrs and Technicians im Dzerzhinskiy

268T60

since founding of section in 1951. Notes augmented conference on dielec heating was held May 1953 with participants from Leningrad, Kiev, Gor'kiy, Khar'kov.

268T60

AVAYEV, S. A.

Subject : USSR/Electricity AID P - 467
Card 1/1 Pub. 27 - 30/34
Authors : Netushil, A. V., Dr. of Tech. Sci., Avayev, S. A., Kand. of Tech. Sci., Members of MONITOE (Moscow Scientific and Technical Society of Power Engineers and Technicians)
Title : Conference on the Problems of Combined High Frequency Heating and Drying of Wood Pulp. (Current News)
Periodical : Elektrichestvo, 7, 92, J1 1954
Abstract : On the 14th and 15th of April 1954, the Electro-Thermic Section of MONITOE organized a conference in Moscow on problems of combined high frequency heating and drying of wood pulp.
Institution : MONITOE (Moscow Scientific and Technical Society of Power Engineers and Technicians).
Submitted : No date

AVAYLY, SERGEY ALEKSANDROVICH

AVAYEV, Sergey Aleksandrovich; GARTUNG, Sergey Vasil'yevich; SHMELEV,
Aleksandr Nikolayevich; PIEMYANNIKOV, M.N., redaktor; METUSHIL, A.V.,
professor, doktor tekhnicheskikh nauk, retsenzent; TULYUSIN, M.V.,
inshener, retsenzent; BL'KINA, Ye.M., tekhnicheskiy redaktor

[Electrical equipment for light industry] Elektrooborudovanie
predpriyatii legkoi promyshlennosti. Moskva, Gos.nauchno-tekhn.
izd-vo Ministerstva tekstil'noi promysh.SSSR, 1955. 308 p.
(Electric engineering) (MIRA 9:1)

AVAYEV, S.A.

GARTUNG, Sergey Vasil'yevich; DUBKOV, Dmitriy Mikhailovich; POLUSHKIN, Aleksey Mitrofanovich; AVAYEV, S.A., retsenzent; GORODOV, K.I., retsenzent; KRYLOV, A.P., retsenzent; POLOZOV, A.I., retsenzent, [deceased]; SKDOV, D.A., retsenzent; LIOZNOV, A.G., redaktor; NEKRASOVA, O.I., tekhnicheskij redaktor.

[Manual for engineers in textile industry] Spravochnik energetika tekstil'noj promyshlennosti. Moskva, Gos.nauchno-tekhn.isd-vo Ministerstva promysh.tovarov shirokogo potrebleniia SSSR. Vol. 1 [Electric engineering] 1955. 630 p. (MLRA 8:12)
(Electric engineering)

AVAYEV, Sergey Aleksandrovich; GARTUNG, Sergey Vasil'yevich; SHMELEV,
Aleksandr Nikolayevich; TULYUSIN, M.V., inzhener, retsenzent;
KRYLOV, A.P., inzhener, retsenzent; PLEMYANNIKOV, M.N., redaktor;
MEDVEDEVA, E.Ya., tekhnicheskii redaktor

[Electric substations, networks, and illumination in light industry]
Podstantsii, seti i osveshchenie predpriatii legkoi promyshlennosti.
Moskva, Gos. nauchno-tekhn. izd-vo Ministerstva legkoi promyshl.
SSSR, 1956. 439 p. (MLRA 9:9)
(Electric engineering)

24(3)

PHASE I BOOK EXPLOITATION SOV/1643

Avayev, Sergey Aleksandrovich, Andrey Pavlovich Krylov, and
Boris Mikhaylovich Ozerskiy

Obshchaya elektrotehnika (General Electrical Engineering)
Moscow, Gosenergoizdat, 1959. 447 p. 100,000 copies printed.

Ed. (Title page): S.A. Avayev; Ed. (Inside book): M.P. Lepinskiy;
Tech. Ed.: K.P. Voronin.

PURPOSE: This book was approved by the Main Administration of
Specialized Secondary Schools, Ministry of Education, USSR,
as a textbook for tekhnikums other than those specializing in
electrical engineering.

COVERAGE: The book contains basic information on the concept of
the electric field, conductors, dielectrics, semiconductors,
capacitors, d-c circuits, magnetism, single-phase a-c circuits,
three-phase circuits, electrical measuring instruments, d-c
machines, transformers, induction motors, converters and

Card 1/15

General Electrical Engineering

SOV/1.643

amplifiers, electronic components, electric drives, electric lighting, electric power stations, substations and networks. The book also provides review questions and exercises and contains a number of laboratory experiments. The authors thank Professor B.A. Teleshev and the faculty of the Moskovskiy stankostroitel'nyy tekhnikum for their assistance and Engineer M.P. Lepinskiy for editing the manuscript. There are no references.

TABLE OF CONTENTS:

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List of Units, Symbols, and Graphical Symbols	11
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Ch. I. The Electric Field	19
1. Electrically charged particles	19
2. Concept of the electric field	22
3. Conductors, dielectrics and semiconductors	30
4. Dielectrics in an electric field. Polarization of dielectrics. Polarization current	32

Card 2/15

NETUSHIL, Anatoliy Vladimirovich; ZHUKHOVITSKIY, Boris Yakovlevich;
KUDIN, Vsevolod Nikolayevich; PARINI, Yevgeniy Pavlovich;
AVAYEV, S.A., red.; MATVEYEV, G.I., tekhn.red.

[High-frequency heating of dielectrics and semiconductors]
Vysokochastotnyi nagrev dielektrikov i poluprovodnikov. Izd.2.,
perer. Pod red. A.V.Netushil. Moskva, Gos.energ.izd-vo, 1959.
479 p. (MIRA 12:3)
(Induction heating) (Dielectrics) (Semiconductors)

5/196/62/000/006/016/018
E194/E154

AUTHOR: Avayay, S. A.

TITLE: A procedure for the determination of the economics of high frequency heating

PERIODICAL: Referativnyy zhurnal, Elektrotehnika i energetika, no.6, 1962, 17, abstract 6 K90. (Tr. Mosk. in-ta khim. mashinostr., v.21, 1960, 23-43).

TEXT: A procedure is given for determining the power consumption per unit of output (heating) and per kilogram of evaporated moisture (drying); a method of determining the unit power consumption in the furnaces of boilers for power supply; and also a procedure for calculating the industrial efficiency and cost. The specific energy consumption and efficiency are compared for the cases of pure thermal, pure high-frequency, and combined procedures for the cases of drying: yarn on bobbins, timber, and sheepskins. It is shown that energy characteristics are insufficient for objective assessment of the economic advisability of application to heat treatment because different

Card 1/2

A procedure for the determination... S/196/62/000/006/016/018
E194/E154

processes last for different times, result in products of different quality, require different amounts of initial materials, and take up different amounts of space; they may hinder or facilitate automation, and so on. An economic criterion is given for the process of heat treatment; its calculation is illustrated by an example of various methods of drying timber. The criterion reflects all the equipment requirements and the method of heat treatment, with allowance for the cost and quality of production, in a simple and vivid form. It is, therefore, recommended as a universal objective economic index.

[Abstractor's note: Complete translation.]

Card 2/2

AVAYEV, Sergey Aleksandrovich; ZINGMAN, Aleksandr Abramovich; KOZLOV, B.P.,
retsenzent; ROZANOV, S.P., retsenzent; BELOV, V.P., retsenzent;
SHTEYNGART, M.D., red.; SHVETSOV, S.V., tekhn. red.

[Fundamentals of the automation of technological processes in the
textile and other light industries] Osnovy avtomatizatsii tekhnolo-
gicheskikh protsessov v tekstil'noi i legkoi promyshlennosti.
Moskva, Izd-vo nauchno-tekhn.lit-ry RSFSR, 1961. 378 p.

(Automatic control) (Factories—Equipment and supplies) (MIRA 14:12)

AVAYEV, Sergey Aleksandrovich; GARTUNG, Sergey Vasil'yevich; SHMELEV,
Aleksandr NIKolayevich; GROMOVA, T.G., red.; BATYREVA, G.G.,
tekhn. red.

[Electric-power equipment in textile and light industry
enterprises] Elektrosilovoe oborudovanie predpriatii tekstil'-
noi i legkoi promyshlennosti. Moskva, Gizlegprom, 1963. 299 p.
(MIRA 16:10)

(Factories--Electric equipment)

AVAYEV, Sergey Aleksandrovich, kand. tekhn. nauk; BELOV, Vladimir Pavlovich; ZINGMAN, Aleksandr Abramovich; MILOVIDOV, Nikolay Nikolayevich; SIDOROV, Yuriy Pavlovich; SIMIGIN, Petr Andreyevich; GARTUNG, S.V., retsenzent; KRYLOV, A.P., retsenzent; CHUGREYEVA, V.N., red.; VINOGRADOVA, G.A., tekhn.red.

[Automatisation of technological processes in the cotton industry] Avtomatizatsia tekhnologicheskikh protsessov khlopchatobumazhnoi promyshlennosti. Moskva, Gizlegprom, 1963. 279 p. (MIRA 16:11)

(Cotton machinery) (Automation)

AVAYEV, S.A.; ISH, N.N., red.

[Practical laboratory work on the course "Fundamentals of production mechanization and automation" for the city professional technical schools of the textile industry]
Laboratorno-prakticheskie raboty po kursu "Osnovy mekhanizatsii i avtomatizatsii proizvodstva" dlia gorodskikh professional'no-tekhnicheskikh uchilishch tekstil'noi promyshlennosti. Moskva, Vysshiaia shkola, 1964. 38 p.
(MIRA 17:10)

AVAYEV, Sergey Aleksandrovich; GAL'PERIN, Mikhail Moiseyevich;
KRYLOV A.P., redsentsent; DIVAVIN, N.I., redsentsent;
AGADZHANOVA, I.A., red.

[Fundamentals of mechanization and automation in the
textile industry] Osnovy mekhanizatsii i avtomatizatsii
proizvodstva v tekstil'noi promyshlennosti. Moskva, Izd-
vo "Legkaia industriia," 1964. 245 p. (MIRA 18:1)

~~AVAYEV, Sergey Aleksandrovich; GARTUNG, Sergey Vasil'yevich;~~
SIMELEV, Aleksandr Nikolayevich; MIRTOV, N.M.,
retsenzent; SHTEYNGART, M.D., red.

[Electric power supply of textile plants and light
industry] Elektrosnabzhenie predpriyatiy tekstil'noi i
legkoi promyshlennosti. Moskva, Legkaia industriia,
1964. 417 p. (MIRA 17:11)

ACCESSION NR: AT4019050

S/0000/63/000/000/0207/0210

AUTHOR: Avayev, V. N.; Yegorov, Yu. A.; Yemel'yanov, I. Ya.; Zhirnov, A. D.; Orlov, Yu. V.; Remizov, V. A.

TITLE: The Gamma-spectrum of a research reactor

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 207-210

TOPIC TAGS: reactor, reactor shielding, reactor Gamma spectrum, Gamma spectrum

ABSTRACT: By means of a scintillation vapro spectrometer, the γ -spectrum of a water-water, pool-type research reactor was measured. The gamma quanta were directed from the active section of the reactor to the spectrometer through a lateral experimental channel, 100 mm in diameter and 2.5 m in length. To exclude the influence of gamma quanta scattered in the channel, a lead collimator, 180 mm in length with a collimation aperture diameter of 10 mm, was inserted in the channel. The spectrometer sensor was placed behind the concrete shielding of the reactor, and the gamma quanta flow passed through a 260-mm long collimator of paraffin with boron and lead carbide. Since the spectrometer was neutron-sensitive, even if only to a negligible degree, tests were conducted under identical conditions with a 100-mm thick bismuth filter and the introduction

Card

1/3

ACCESSION NR: AT4019050

of the proper corrective factor. The results of the experiment are discussed and analyzed. The reactor spectrum was measured to approximately 7.8 Mev. No gamma lines with greater energy were detected, the explanation for this being that in the high energy region the γ -radiation is basically caused by the absorption of neutrons by iron, nickel and chromium. These elements are not present in the active part of the reactor, while the γ -radiation yield from the tube of the gate valve is small and only a negligible part of the trapped gamma quanta is able to reach the spectrometer sensor from the tube. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 14Aug63

DATE ACQ: 27Feb64

ENCL: 01

SUB CODE: NS

NO REF SOV: 005

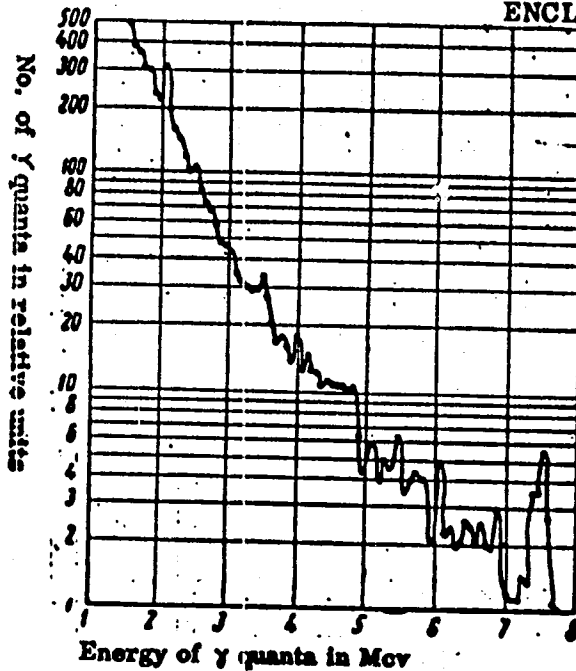
OTHER: 001

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ACCESSION NR: AT4019050

ENCLOSURE: 01

Fig. 1 - Gamma-spectrum
of the reactor.



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L 17336-63 EPR/EWP(j)/EWT(d)/EPF(e)/EWF(n)-2/EWT(m)/FCC(w)/BDS AFFTC/
ASD/IJP(G)/SSD Pr-4/Ps-4/Po-4/Pu-4 RM/WW

ACCESSION NR: AP3004886

S/0120/63/000/004/0039/0045

AUTHOR: Avayev, V. I.; Yegorov, Yu. A.; Orlov, Yu. V.; Frolov, A. S.; Chentsov, N. N.

TITLE: Fast-neutron spectrometer with borane scintillator 19 9 85

SOURCE: Pribery*1 tekhnika eksperimenta, no. 4, 1963, 39-45

TOPIC TAGS: spectrometer, fast-neutron spectrometer, borane scintillator, scintillator

ABSTRACT: Fundamental characteristics of the fast-neutron spectrometer with one primary detector were calculated on a computer by the Monte-Carlo method. Detailed calculating procedure is illustrated by a chart. "Pseudo-random numbers of the type suggested by N. M. Korobov were used in the calculations." The accuracy of the calculations is held to be 1% or better. Made for three scintillators, the calculations permitted determining efficiency, proper energy

Card 1/2

L 17336-63

ACCESSION NR: AP3004886

Resolution, etc. Analysis of the results permits selecting the optimum delay time in the control channel, resolution time of the coincidence circuit, permissible loading of the spectrometer, and its block scheme. A comparison of several versions of the spectrometer showed that the best composition is a mixture of equal amounts of xylol (or phenylcyclohexane) and trimethylborate with B¹⁰ enriched to 80%. The resolution time of the coincidence circuit must be 1.5 microsec. Orig. art. has: 7 figures, 6 formulas, and 2 tables.

ASSOCIATION: none

SUBMITTED: 31Aug62

DATE ACQ: 28Aug63

ENCL: 00

SUB CODE: NS

NO REF SOV: 005

OTHER: 007

Card 2/2

L 12860-63 EWP(j)/EPF(c)/EPF(n)-2/EWT(m)/BDS AFFTC/ASD/SSD Pc-4/
Pr-4/Pa-4 RM/WW/DM
ACCESSION HR: AP3003970 S/0089/63/015/001/0017/0020 78

AUTHOR: Avayev, V. N.; Vasil'yev, G. A.; Veselkin, A. P.; Yegorov, Yu. A.;
Orlov, Yu. V.; Pankrat'yev, Yu. V.

TITLE: Reactor neutron flux attenuation in polyethylene¹⁵

SOURCE: Atomnaya energiya, v. 15, no. 1, 1953, 17-20

TOPIC TAGS: neutron attenuation, polyethylene, polyethylene neutron attenuation, slow neutron, fast neutron, neutron relaxation length, biological shielding, water-water reactor

ABSTRACT: The attenuation of fast and slow neutron fluxes by polyethylene has been investigated experimentally in a water-water research reactor. ¹⁹
A polyethylene 680 x 680 x 1000-mm prism consisting of square plates 10 and 20 mm thick was irradiated¹⁹ by placement in a recess in the heavy concrete shielding of the reactor. The slow neutron fluxes were measured by the use of resonant indicators (indium, iodine) and a BF₃ counter. The fast neutron distribution was measured by means of threshold indicators P(n,p), Al(n,p), and Al(n, α) and a scintillation counter with ZnS(Ag). During measurements the plane indicators were inserted into gaps between the polyethylene plates, and

Card 1/2

L 12860-63

ACCESSION NR: AP3003970

the cylindrical indicators were placed into 20 x 20 x 100-mm holes cut in the plates. The results obtained are shown in Figs. 1 and 2 of the Enclosure, along with theoretical data obtained by the method of moments for a point neutron source. A comparison of neutron relaxation length in polyethylene (density, 0.92 g/cm³) and in water under identical conditions showed that the relaxation length in polyethylene is 12--17% shorter than that in water. "The authors thank the reactor operating personnel and laboratory technicians who took part in the experiment." Orig. art. has: 2 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 25Aug63

DATE ACQ: 08Aug63

ENCL: 01

SUB CODE: NS

NO REF SOV: 004

OTHER: 004

Card 2/22

T 11129-63 EWP()/EFP(n)-2/EWT(m)/EDS AFFTC/ASD/AFWL/SSD
Pc-4/Pu-4 RM/DM
ACCESSION NR: AP300397L 8/0089/63/015/001/0020/0022 72

AUTHOR: Avayev, V. N.; Vasil'yev, G. A.; Vessel'kin, A. P.; Yegorov, Yu. A.; Orlov, Yu. V.; Pankrat'yev, Yu. V.

TITLE: Spectra of reactor fast neutrons¹⁹ passed through polyethylene¹⁵

SOURCE: Atomnaya energiya, v. 15, no. 1, 1963, 20-22

TOPIC TAGS: fast neutron spectra, polyethylene, reactor shielding

ABSTRACT: Measurements were made of the spectra of fast neutrons after passage through a layer of polyethylene plates (680 x 680 x 10 mm) installed in a recess of the shielding of a water-water reactor. The thickness of the polyethylene layer was increased on the side facing of the spectrometer detectors. The measurements were made by means of a fast-neutron spectrometer with a single detector in which γ -background discrimination was achieved by means of a space charge between the last dynode and anode of the photomultiplier. The fast-neutron spectra were determined from the amplitude distribution of pulses produced by recoil protons in the stilbene crystal of the detector. The spectra were corrected for the effect of secondary neutron scattering in the crystal and for partial leakage of recoil protons from the crystal. The results obtained

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L 11129-63

ACCESSION NR: AP3003971

are shown in Fig. 1 of the Inclosure along with the results calculated by the method of moments (shown by the solid line). The measured spectra were found to be in good agreement with theoretical results for all thicknesses of the polyethylene layer at $E_n > 3\text{Mev}$. At $E_n < 3\text{Mev}$ a divergence between the experimental and calculated results was noted. However, the tendency for a change in spectra with an increase in layer thickness in this energy range was the same for both calculated and experimental spectra. At neutron energies from 3 to 4 Mev and polyethylene thicknesses greater than 20 g/cm^2 , the curve of the measured spectra showed a sharper dip than that of the calculated spectra. This is probably due to some inaccuracy in selecting or averaging the cross sections during calculation. The sharper dip in the curve was also noted in neutron spectra measured in water. "The authors thank their coworkers who serviced the reactor and laboratory assistants who assisted in the carrying out of experiments." Orig. art. has: 1 figure.

ASSOCIATION: none

SUBMITTED: 25Aug62

SUB CODE: NS

Card 2/32

DATE ACQ: 08Aug63

NO REF SOV: 003

ENCL: - 01

OTHER: 002

ACCESSION NR: AP4029699

S/0089/64/016/004/0355/0356

AUTHORS: Avayev, V. N.; Yegorov, Yu. A.; Moiseyev, G. G.

TITLE: Attenuation of neutron with an energy exceeding 1.5 Mev in iron

SOURCE: Atomnaya energiya, v. 16, no. 4, 1964, 355-376

TOPIC TAGS: fast neutron, relaxation length, threshold energy, semiinfinite geometry, indium indicator, inelastic scattering, water moderated reactor, fission spectrum

ABSTRACT: A study of the penetration of fast neutrons through iron involved the determination of the relaxation lengths λ for neutrons with an energy greater than 2 Mev. It may be assumed that as the energy of the fast neutrons approaches the threshold energy (where inelastic iron-nuclei scattering begins), the relaxation lengths of the fast neutrons should increase. The spatial distribution of neutrons with an energy greater than 1.5 Mev in iron was therefore measured in a water-moderated, water-cooled research reactor in conditions of a "semiinfinite" geometry. The neutrons were recorded

Card 1/2

ACCESSION NR: AP4029699

by an indium indicator [reaction $In(n, n') In^m$]. The reaction threshold is somewhat reduced with the increasing thickness of the iron layer due to the attenuation of the neutrons spectrum. The absolute values of the relaxation length are somewhat higher than indicated by the calculations, which is probably due to the differences in the geometries of the experiments. The increasing relaxation length with the growing thickness of the iron layer may be explained by the accumulation of neutrons in the iron with an energy close to the energy threshold of the inelastic iron nuclei-neutron scattering. This was verified under the same conditions by measuring the spatial distribution of neutrons in iron with threshold indicators made of phosphorus ($E_{\text{thresh.}} = 3 \text{ Mev}$) and aluminum ($E_{\text{thresh.1}} = 5 \text{ Mev}$, and $E_{\text{thresh.2}} = 7 \text{ Mev}$). Orig. art. has: 1 table.

ASSOCIATION: None

SUBMITTED: 19Jul63

DATE ACQ: 01May64

ENCL: 00

SUB CODE: PH, NS

NR REF SOV: 004

OTHER: 003

Card 2/2

ACCESSION NR: AT4019060

S/0000/63/000/000/0260/0270

AUTHOR: Avayev, V. N.; Vasil'yev, G. A.; Yegorov, Yu. A.; Kucheryayev, V. A.; Orlov, Yu. V.; Pankrat'yev, Yu. V.; Panov, Ye. A

TITLE: Counters and dosimeters for the study of shielding and shielding properties of materials

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding, collection of articles). Moscow, Gosatomizdat, 1963, 260-270

TOPIC TAGS: counter, scintillation counter, dosimeter, shielding, reactor shielding, nuclear reactor, gamma ray, neutron

ABSTRACT: In the study of the shielding properties of different materials and their combinations, it is important to know the following parameters: coefficients of attenuation of γ -ray and neutron streams of different energies; coefficients of attenuation of the power level of γ -radiation and fast neutrons; yield and spectrum of captured γ -radiation; activation of materials in a neutrons flux; and deformation of the γ -ray and neutron spectra in their passage through the material. Since existing equipment is insufficient for shielding studies, the authors built and tested a number of scintillation counters and dosimeters.

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Among those described are a scintillation counter and spectrometer for the study of the attenuation of γ -ray flux, consisting of a FEU-11B photomultiplier with an NaI(Tl) crystal (diameter and height 40 mm) mounted in a housing lined with aluminum foil, and a scintillation neutron counter consisting of a FEU-11B photomultiplier with plastic scintillator of ZnS(Ag) + lucite (diameter 30, height 10 mm). For neutron energies ≥ 2 MeV, the γ -ray background is calibrated with a Co60 source and eliminated by the proper bias in the analyzer. A similar neutron counter can be used as a monitor. A light guide in conjunction with a smaller counter is used when the opening in the shielding is too small. This light guide is made of organic glass (length 60, diameter 10 mm) and is equipped with a light collector (Tove, P. A. Rev. of Sci. Inst. 27, 143 (1956)). For neutron energies between 1 and 10 Mev, a stilbene crystal is used (diameter 30, height 20 mm) equipped with the γ -discrimination arrangement described by H. W. Broch (Rev. Sci Instr. 31, 1063 (1960)). The detection efficiency for neutrons between 1 and 10 Mev is 10 - 2%. For thermal neutron detection, a FEU-29 or FEU-31 photomultiplier with an Li₂O-3SiO₂ glass scintillator is used. Detection is based on the reaction $\text{Li}^6 + n \rightarrow \alpha + \text{H}^3$. The sensitivity of these counters to γ rays is calibrated by Zn⁶⁵ to Co⁶⁰ sources. All-wave-length neutron counters are constructed as gas counters (type SNM-5) filled with BF₃ and enclosed in paraffin, which is lined on the outside with cadmium. Dosimeters for fast neutrons are

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made from plastic scintillators (polystyrene + terphenyl + ROROR) attached to a FEU-25 photomultiplier. The photomultiplier current is integrated and amplified by a direct current amplifier. The maximum sensitivity of this dosimeter is $0.2 \mu F/sec$ per division. In order to eliminate γ -ray background, the measurements are made simultaneously with a γ -ray dosimeter which is a combination of the plastic and inorganic scintillators. A crystal of CsI(Tl) (volume 1.5 cm^3) is mounted on the axis of the plastic crystal (polystyrene + terphenyl + ROROR). Finally, a universal stand for detection and power supply is described. "The authors thank V. M. Isakov, D. I. Chupy*rin, A. I. Vasil'yev, V.N. Kozy*rev and Yu. G. Anisimov for taking part in the construction and adjustment of the apparatus." Orig. art. has: 9 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 14Aug63

SUB CODE: NP

DATE ACQ: 27Feb64

NO REF SOV: 015

ENCL: 00

OTHER: 004

Card 3/3

ACCESSION NR: AT4019061

S/0000/63/000/000/0270/0277

AUTHOR: Avayev, V. N.; Voskresensky, Ye. V.; Yegorov, Yu. A.; Orlov, Yu. V.

TITLE: Use of radioactive indicators in the investigation of shielding

SOURCE: Vorposy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 270-277

TOPIC TAGS: nuclear reactor, reactor shielding, shielding evaluation, radioactive indicator, neutron detector, scintillation counter, Gamma ray, neutron

ABSTRACT: The authors suggest that the efficiency of radioactive indicators such as Al^{27} , Mn^{55} , In^{115} , I^{127} or Au^{197} can be increased by an improved method for detecting and counting the γ -rays. The advantages of using radioactive indicators as neutron detectors in the study of shielding are: (1) the ability to detect neutrons which are either above certain energy levels (threshold detectors) or within a certain energy interval (resonance detectors); (2) the smallness of the indicators (can be used without disturbing the distribution of the neutron flux); (3) insensitivity to γ radiation; and (4) ability to be used to estimate the neutron energy spectrum. The disadvantages are their small effective cross section and the relative insensitivity of the gas counters used in conjunction with the indicators to measure the γ radiation. In the present paper, in order to increase detection efficiency, a 4 π

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thermal and epithermal neutrons in the detection of fast neutrons by a radioaluminum indicator is shown. "The authors thank D. I. Chupy*rin for assembling and adjusting the electronic apparatus and N. Ye. Vasin for designing the ^{47}Ca -counter." Orig. art. has: 6 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 14Aug63

SUB CODE: NP

DATE ACQ: 27Feb64

NO REF SOV: 004

ENCL: 00

OTHER: 002

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ACCESSION NR: AT4019064

S/0000/63/000/000/0289/0303

AUTHOR: Avayev, V. N., Yegorov, Yu. A., Orlov, Yu. V., Frolov, A. S., Chentsov, N.N.

TITLE: Computation and analysis of the characteristics of a spectrometer with a boron-hydrogen scintillator

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 289-303

TOPIC TAGS: nuclear reactor, reactor shielding, spectrometer efficiency, xylene borate scintillator, phenylcyclohexane borate scintillator, radiation dosimetry, scintillation spectrometer, boron hydrogen scintillator, neutron energy, yield nucleus method, twin sensor spectrometer, neutron spectrometer

ABSTRACT: Among the methods for determining the energy of fast neutrons, the authors call particular attention to the yield nucleus method, noting that a special position in this method is occupied by scintillation spectrometers. Twin-sensor fast-neutron spectrometers are described and their operational principles are briefly analyzed. It is pointed out that fast-neutron spectrometers with two sensors can operate only with collimation of the neutron stream. The limitations imposed by this circumstance, particularly with reference to the study of fast-neutron spectra behind shielding, are noted. The subject of spectrometers

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with one hydrogen-containing sensor is introduced. The discrimination of the gamma-background in these spectrometers is accomplished through the difference in the glow time of the scintillator when excited by protons and electrons. It is further noted that spectrometers with a single hydrogen-containing sensor are capable of operating without a collimation device. The lower boundary of the measured neutron energy levels is normally not less than 0.7 Mev. While such instruments have been used for a wide variety of test purposes, the author observes that spectrometers with a hydrogen-containing sensor cannot be used for measurements against a high gamma-background. The single-sensor scintillation spectrometer, the scintillator of which contains hydrogen and boron, and which was proposed by Marshall (Bull. Amer. Phys. Soc., 27, 11 (1952)), is described in detail and its advantages are analyzed. It is noted, however, that the data necessary to permit the actual construction of such a spectrometer are lacking in the available technical literature. The following values in particular, are unknown: 1) the efficiency of the spectrometer as a function of the energy of the neutrons; 2) the efficiency as a function of the volume of the scintillator and the ratio of the hydrogen and boron concentrations in it; 3) the time distribution of the pulses from the alpha-particles (with the time read from the moment of the first scattering of the neutron); 4) the energy resolution of the spectrometer as a function of the energy of the neutrons. Noting that attempts have been made to supply this lacking information manually by means of the Monte Carlo method, the results of which have made it

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possible to draw certain useful conclusions leading to an initiation of work on the design of a spectrometer, the author calls attention to the failure of the manual method of calculation to provide a complete picture of the required characteristics and the great amount of time such computation techniques necessarily consume. The present article, therefore, reports detailed computations of the characteristics of a boron-hydrogen scintillation-type spectrometer, conducted with the aid of an electronic computer. In individual sections of the paper the author discusses the formulation of the problem, the actual computation of the spectrometer characteristics, the fundamental block-diagram of the program used to carry out the spectrometer characteristic computation described in the article and, finally, an analysis of the results of the computation, on the basis of which all the laws characteristic of a spectrometer with a boron-hydrogen scintillator are explained. The author learned, among other things, that: 1) Spectrometer efficiency as a function of the resolving time of the coincidence circuit has a maximum value, the position of which (on the various graphs and curves plotted in the article) is different for scintillators of different dimensions and composition; 2) Spectrometer efficiency is directly proportional to the concentration of boron nuclei; 3) The efficiency maximum is more distinctly expressed for scintillators with a higher concentration of boron nuclei; 4) The efficiency maximum is less clearly expressed for large volume scintillators; 5) The efficiency maximum is less clearly expressed for a cylindrical scintillator than for a spherical one with identical diameters of the sphere and

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cylinder base, and is shifted in the direction of greater coincidence circuit resolving time. The results of the computation and analysis of the characteristics of a scintillation spectrometer with a boron-hydrogen scintillator showed that, of all the compositions considered, the most suitable is a mixture of equal parts of xylene (dimethylbenzene), or phenylcyclohexane with trimethyl borate with boron B¹⁰ enriched to 80%, poured into a vessel 80 mm in both diameter and height. The resolving time of the coincidence circuit in this case should be equal to approximately 1.5 microseconds. On the basis of the study, the block-diagram of the spectrometer shown in Figure 1 of the Enclosure was adopted for development. In order to reduce the number of random coincidences, a single-channel pulse amplitude analyzer was introduced into the spectrometer control circuit. Orig. art. has: 11 figures and 13 formulas.

ASSOCIATION: None

SUBMITTED: 14Aug63

DATE ACQ: 27Feb64

ENCL: 01

SUB CODE: NP, OP

NO REF SOV: 010

OTHER: 008

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ACCESSION NR: AT4019064

ENCLOSURE: 01

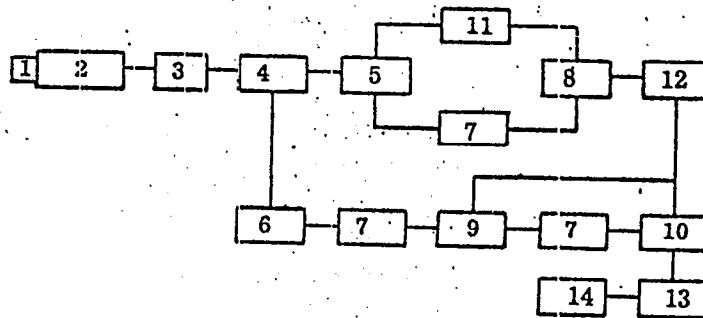


Fig. 1 - Proposed block diagram of a boron-hydrogen scintillation spectrometer:
 1) C - scintillator; 2) K₁₇ - cathode follower; 3) λ - photomultiplier;
 4) ΠY_c - preamplifier; 5) Y_c - amplifier; 6) ΛY_c - linear amplifier;
 7) Δ - delay line; 8) CC - coincidence circuit; 9) Γ - blocking unit;
 10) Ξ K - electronic key; 11) OA - single-channel pulse amplitude analyzer;
 12) PO - regulating monovibrator; 13) O - limiter; 14) AA - multichannel pulse amplitude analyzer.

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S/0000/63/000/000/0281/0289

AUTHOR: Avayev, V. N.; Yegorov, Yu. A.; Orlov, Yu. V.

TITLE: Computation of the characteristics of gamma-radiation and fast neutron spectrometers by the random test method

SOURCE: Voprosy* fiziki zashchity* reaktorov; sbornik statey (Problems in physics of reactor shielding; collection of articles). Moscow, Gosatomizdat, 1963, 281-289

TOPIC TAGS: nuclear reactor, reactor shielding, radiation spectrum, neutron scattering, radiation dosimetry, neutron, Gamma ray, scintillation spectrometer, crystal spectrometer, random test method, Monte Carlo method

ABSTRACT: The authors note that the most convenient devices for the study of continuous γ -radiation and neutron spectra are γ -radiation scintillation spectrometers with complete absorption of the γ -quanta energy, that is, spectrometers with a large-size scintillator, and also fast-neutron spectrometers with one sensor. The relative advantages and disadvantages of these types are discussed and the preference is accorded to spectrometers with large crystals. Processing of the test results obtained with these spectrometers is possible provided one knows the forms of the instrument lines of the monochromatic radiations at a number of energy values and the dependence of the efficiency on the energy of the gamma-

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radiation and neutrons. It is pointed out that for a scintillation gamma-spectrometer in a gamma-quanta energy range of approximately 100 keV to 3 MeV, the form of the instrument line and the efficiency can be determined experimentally by measuring the gamma-spectra of radioactive sources of γ -radiation (Ce^{141} , Hg^{203} , Cs^{137} , Zr^{95} , Zn^{65} , Na^{24} , and others), but that for higher gamma-radiation energy levels and fast-neutron energies the experimental determination of the efficiency and the form of the line involve great difficulties. These values may be calculated in the case of both spectrometer types by the random test method (otherwise known as the Monte Carlo method). In the present article, a system for spectrometer characteristic computation by this method is considered. For the sake of simplifying the exposition, in both cases a plane problem is solved; that is, the authors consider that all processes of scattering and absorption occur in the xy plane. The authors note that the solution of the spatial problem does not differ essentially from that of the plane problem. The paper is in two sections: in the first - the problem of the computation of the characteristics of a gamma-spectrometer is discussed; in the second - the computation of the characteristics of a neutron spectrometer. In the first case, the movement of the γ -quanta of the source in the scintillator and the movement of the products of its scattering are sequentially examined until either they are absorbed in the crystal or fall outside its limits. For each γ -quantum of the source, a determination is made of

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the portion of the energy which is expended on ionization as a result of secondary processes. This computation is repeated for a large number of source γ -quanta. The results thus obtained are used to construct rated spectra - histograms (frequency polygons) which define the resolution of the spectrometer (without consideration of the physical resolution determined by the resolving power of the scintillator and photomultiplier). A comparison of the number of "absorbed" gamma-quanta with the number of those considered determines the efficiency of the spectrometer. In the second section of the article, a general description of the physical composition and operational principle of this type of instrument is given. The problem of the time lag between the moment of formation of the proton pulse and the pulse from the alpha-particle is discussed. The determination of the efficiency and resolution of a fast-neutron scintillation spectrometer, and also a rational selection of the delay time, requires the solution of a problem, formulated by the authors in the following terms: Incident to and along the axis of a cylindrical scintillator, the composition of which contains hydrogen, carbon, oxygen and boron atoms, is a stream of neutrons having an energy E_0 ; it is necessary to find the time t_0 from the moment of the first scattering in the hydrogen to the moment of the capture of the neutron by the boron nucleus, to determine what part of its energy the neutron has lost as a result of scattering on the hydrogen nuclei, and to find the ratio n_b/n_0 , where n_0 is the stream of source neutrons, and n_b is the

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