MOROZOV, V.

USSR/Nuclear Physics - Cosmic Rays
Nuclear Physics - Mesons

Dec 47

"Mass Spectra of Varitrons," A. Alikhanyan, Corr Mem, Acad Sci USSR; A. Alikhanov, Academician; V. Morozov, G. Muskhelishvili, A. Khrimyan, Phys Inst, Acad Sci, Armenian SSR, 3 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVIII, No 7

Authors reported in previous article that, as a result of magnetic analysis of composition of cosmic radiation at an altitude of 3,250 meters, new particles discovered which have amass greater than the mass of the mesotron. Also presented data showing that, in cosmic radiation, there are particles with a positive and negative sign, the mass of which exceeds that of the protron. This new group of elementry particles named varitrons. Present articlespresents results of spectrum analysis of these new particles.

PA 60T80

MOROZOV, V.
~~Morozov, G.~~

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USSR 15089 TT-101(Rev.) 4

THE MASS SPECTRUM OF VARITRONS. (Spectr Mass Varitronov)/ A. Alikhanian, A. Alikhanov, V. Morozov, G. Muskhelishvili, and A. Khrimian. Translated ~~and revised~~ by G. Belkov from Zhur. Ekspt'. i Teoret. Fiz. 18, 673-702 (1948). 54p. 62

A mass spectrometer consisting of a large constant magnet and several groups of counters was constructed for the analysis of the mass of particles which constitute the soft and hard components of cosmic rays. The large dispersion of the spectrometer made it possible to establish that the mass spectrum of varitrons consisted of individual discrete lines. It was established that at 3250m above sea level there are present in cosmic rays more than 12 varieties of varitrons of different mass and having both positive and negative charges. The mass of a varitron varies from 100 to 25,000 electron masses. Simultaneously it was shown that varitrons are also a constituent of the hard component of cosmic rays. An analysis of the spectrum of the moments

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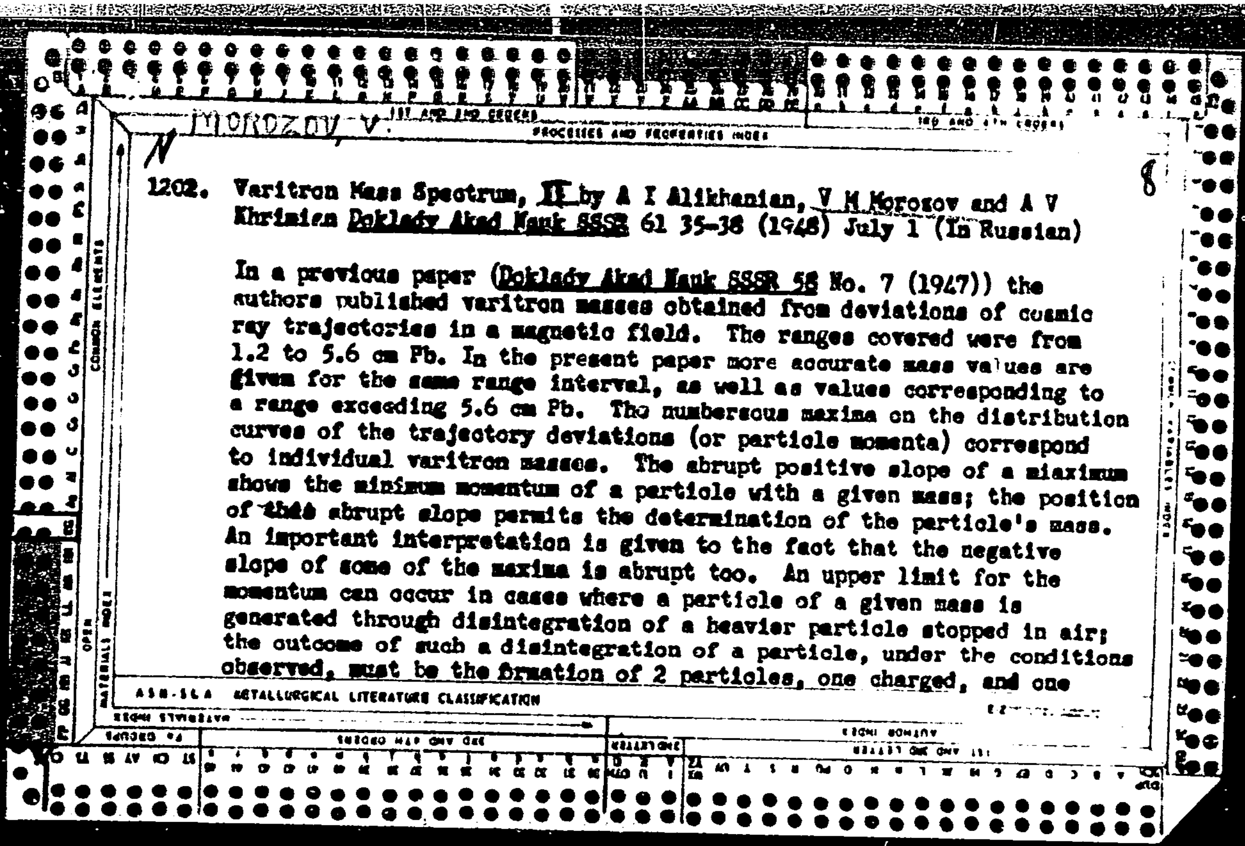
(over)

of the hard component showed that the varitrons, recorded by a spectrometer, arise as a result of the decomposition of heavier varitrons stopped in the air. The presence of fast protons in cosmic rays was proven by direct measurements. From the determination of the positive excess in the spectrum of the hard component it is possible to conclude that the quantity of fast protons in cosmic rays constitutes not less than 7% of the total intensity. (auth)



MOROZOV, V.

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1ST AND 2ND DIGITS
PROCESSES AND PROPERTIES INDEX
3RD AND 4TH DIGITS
COMMON ELEMENTS
OPEN
MATERIALS INDEX

1202. Varitron Mass Spectrum, II by A I Alikhanian, V M Morozov and A V Khrimian Doklady Akad Nauk SSSR 61 35-38 (1948) July 1 (In Russian)

In a previous paper (Doklady Akad Nauk SSSR 58 No. 7 (1947)) the authors published varitron masses obtained from deviations of cosmic ray trajectories in a magnetic field. The ranges covered were from 1.2 to 5.6 cm Pb. In the present paper more accurate mass values are given for the same range interval, as well as values corresponding to a range exceeding 5.6 cm Pb. The numbersous maxima on the distribution curves of the trajectory deviations (or particle momenta) correspond to individual varitron masses. The abrupt positive slope of a miaximum shows the minimum momentum of a particle with a given mass; the position of this abrupt slope permits the determination of the particle's mass. An important interpretation is given to the fact that the negative slope of some of the maxima is abrupt too. An upper limit for the momentum can occur in cases where a particle of a given mass is generated through disintegration of a heavier particle stopped in air; the outcome of such a disintegration of a particle, under the conditions observed, must be the formation of 2 particles, one charged, and one

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION neutral or a photon. A tentative mass determination is given for parent varitrons generating the observed particles.

MOROZOV, V.

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717 Investigation of the Mass Spectrum of Varitrons. I. A. Alikhanyan, V. Morozov, A. Khrimyan, G. Muskhelishvili, and V. Kamalyan. Zhur. Ekspti. i Teoret. Fiz. 19, 1021-56(1949)(In Russian). (See also NSA 2-98, 2-1202, 2-1203, 3-1700.)

Using magnetic analysis, the mass spectrum of varitrons in cosmic radiation was investigated. Owing to a greater resolving power of the instrument, the varitron masses obtained are more accurate than those found in the authors' previous works (Doklady Akad. Nauk S.S.S.R. 58, 1321(1947); Zhur. Ekspti. i Teoret. Fiz. 18, 673 (1948)). The use of low-efficiency counters that recorded only a small percentage of relativistic particles permitted the determination of the ionizing power of varitrons absorbed in lead. The fact that the absorption in the filter is due to ionization losses proves the applicability of the method employed for the measuring of a particle's mass, viz., from its range and its momentum. The spectrum of momenta of the unfiltered radiation in the air shows significant irregularities, in the shape of narrow maxima and plateaus, corresponding to varitrons of different masses. The narrowness of the maxima indicates the short half-lifetime of some of the varitrons, which is much shorter than $10^{-8}$ sec. The spectra show important positive excesses: at 3,250 m altitude about 13% of all particles are fast protons; furthermore, there exists in air a great excess of positive varitrons heavier than the proton.

C.A M[illegible], I. I.

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The remarks of V. A. Kravtsov on "The formula for the mass spectrometer of Alikhanov and Alikhanyan. A. I. Vaisenberg, V. Morozov, and A. Khrimyan. *Zhur. Eksptl. Teoret. Fiz.* 20, 1055(1950); cf. preceding abstr.—The authors show that although the error pointed out by Kravtsov does exist, it exists only in an intermediate equation which was never used for purposes of calcn. They give the equation which was actually used for the calcn. of the impulse and show that it is correct. J. Rovtar Leach

MOROZOV, V.

USSR/ Physics - Luminosity

**Card** : 1/1 Pub. 118 - 9/15

**Authors** : Morozov, V.

**Title** : Measuring luminosity of the day light sky with photoelectric photometers carried up to high altitudes by rockets.

**Periodical** : Usp. fiz. nauk 53/1, 142 - 145, May 1954

**Abstract** : Experiments in measuring the luminosity of day skies, conducted with the help of electro-photometers carried to high altitudes by rockets, are described. Measurements were conducted with various filters. Four references. Tables.

Institution : ...

Submitted : ...

FD-[illegible]

USSR/Physics - Accelerated ions

Card 1/1 Pub 1[illegible]3 - 13/19

Author : Mikhaylov, V. I.; Morozov, V. M.

Title : Stabilization of the field of magnetic analyzer of beam of accelerated ions

Periodical : Zhur. tekh. fiz., [illegible], No [illegible] (September), 1955, [illegible]

Abstract : The authors develop a system of stabilization of the magnetic field of the [illegible] analyzer of electrostatic generator (oscillator), which system possesses the following characteristics: 1) the stabilization is based on continuous measurement of the field in the gap of the electromagnet; 2) the automatic regulation system directly controls the total current of excitation of the magnetic. The described system is being utilized in a small electrostatic generator (G. V. Gorlov, B. M. Gokhberg, V. M. Morozov, and G. A. Otroshchenko DAN SSSR, 102, No 2, 1955) and satisfies well the requirements on operation with monoenergetic beams of ions. Two references: [illegible] V. G. [illegible]henko, B. M. Gokhberg, and V. M. Morozov, DAN SSSR, [illegible]

Institution : --

Submitted : February 5, 1955

MOROZOV, V. M.

USSR/ Physics - Ion accelerators

Card 1/1 Pub. 22 - 12/47

**Authors** : Brovchenko, V. G.; Gokhberg, B. M.; and Morozov, V. M.

**Title** : Stabilization of the energy of ions accelerated with a high voltage electrostatic generator

**Periodical** : Dok. AN SSSR 101/6, 1023 - 1025, Apr. 21, 1955

**Abstract** : A device and the method of its operation in stabilizing the energy of ions accelerated with a high voltage electrostatic generator are described. The energy stabilization is accomplished by the voltage stabilization of the device (ion accelerator). It was determined that the voltage of the accelerator deviates not more than 0.025%. One USSR reference (1955). Diagram.

Institution : Acad. of Sc., USSR, S. I. Vavilov Institute of Physical Problems

Presented by: Academician A. P. Aleksandrov, November 17, 1954

MOROZOV, V. M.

USSR/Physics - Ion generators

Card 1/1 Pub. 22 - 15/49

Authors : Morozov, V. M.

Title : A high-frequency ion generator

Periodical : Dok. AN SSSR 102/1, 61-64, May 1, 1955

Abstract : A description of a high-frequency ion generator is presented. The generator is considered a more effective device, than Van de Graaph's generator. Diagrams.

Institution : The Acad. of Scs., USSR, S. I. Vavilov Institute of Physical Problems

Presented by : Academician A. P. Aleksandrov, November 17, 1954

Morozov, V. M.

USSR/ Physics - Electrostatic generators

Card 1/1 Pub. 22 - 12/59

**Authors** : Gorlov, G. V.; Gokhberg, B. M.; Morozov, V. M; and Otrosh-chenko, G. A.

**Title** : A small electrostatic generator in a condensed gas

**Periodical** : Dok. AN SSSR 102/2, 237-239, May 11, 1955

**Abstract** : A description of a small electrostatic generator is presented. One USSR reference (1955).

**Institution** : Acad. of Sc., USSR, Institute of Physical Problems imeni S. I. Vavilov

**Presented by** : Academician A. P. Aleksandrov, November 17, 1954

MOROZOV, V. M.

V Measurement of the $Li^6(n,t)He^4$ cross section for neutrons with energies from 9 to 700 e.kv. 19 G. V. Gorlov, B. M. Gokhberg, V. M. Morozov, and G. A. Otroshchenko. *Soviet Phys. "Doklady"* 1, 705-7(1956)(English translation); *Doklady Akad. Nauk S.S.S.R.* 111, 791-4; cf. *U.S. Atomic Energy Comm.* AECU-2040(1952).—The resonance peak in the absorption cross section, $\sigma$, of $Li^6$ for the $(n,t)$ reaction was investigated for monoenergetic neutrons provided by the angular selection of neutrons produced in the proton bombardment of T. Relative values of $\sigma$ *vs.* neutron energy, $E_n$, were measured by means of a small ionization chamber, contg. helical electrodes coated with LiF (Li enriched to 92% $Li^6$), placed on a rotatable optical bench that permitted ingress of neutrons at an angle between 0 and 170° to the proton beam. The measurements indicated that $\sigma$ reached a max. when $E_n = 205$ e.kv. Abs. measurements of $\sigma$ were made at this $E_n$ and also at 100 e.kv. by means of a flat ionization chamber contg. parallel plates coated with the same LiF. Values for $\sigma$ of $3.4 \pm 0.3$ and 0.85 b. at 205 and at 100 e.kv., resp., were obtained. These show that the resonance is due primarily to a *p*-wave interaction of neutrons with the $Li^6$ nucleus. James H. Pannell

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MOROZOV, V.M.

Determining changes of time dependent air temperature in the stratosphere probing technique. Izv.AN SSSR Ser.geofiz. no.3:366-371 Mr '56.(MIRA 9:7)
(Atmospheric temperature)

MOROZOV, V.M.; SHKLOVSKIY, I.S.

Day brightness of the sky. Izv.AN SSSR.Ser.geofiz. no.4:464-468 Ap '56. (MLRA 9:8)

1. Akademiya nauk SSSR, Geofizicheskiy institut.
(Sky, Color of)

MOROZOV, V.M.

Origin of noctilucent clouds. Izv.AN SSSR Ser.geofiz. no.7:865-869
Jl '56. (Clouds) (MIRA 9:9)

CARD 1 / 2 PA - 1346

SUBJECT USSR / PHYSICS
AUTHOR GORLOV, G.V., GOCHBERG, B.M., MOROZOV, V.M., ŠIGIN, V.A.
TITLE The Angular Distribution of the Neutrons Produced on the Occasion of the Reaction $T(p,n)He^3$.
PERIODICAL Žurn.techn.fis, 26, fasc. 5, 985-989 (1956)
Issued: 6 / 1956 reviewed: 10 / 1956

This angular distribution was measured for proton energies of 1200, 1400 and 1600 keV. The protons were produced by means of an electrostatic generator and after passing through a 90 degrees magnetic analyzer they were directed upon a tritium target. The system for the voltage stabilization of the generator warrants a constancy of the proton energy which is accurate up to $2.10^{-2}\%$. A solid tritium target was used, and a long counter served as a detector. The proportionality counter had a firm covering of boron and was filled with a mixture of argon and methyl alcohol. Next, the problem of the sensitivity of the long counter with respect to neutrons with different energies is discussed in detail. With the help of the obtained characteristic of sensitivity it was possible to measure the angular distribution of neutrons with more than 25 keV with great accuracy, i.e. for all angles at proton energies of 1400 and 1600 keV and for angles below $152^0$ (in the center of mass system) at 1200 keV. In the case of large angles and 1200 keV accuracy is considerably lower.

Angular distribution was measured inside a cabin of 3 x 3 x 2,5 m, the walls of which were coated with a mixture of paraffin and borax. In the center of the cabin was the tritium target. The long counter was located at the distance of

MOROZOV, V.M.

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THE FULL EFFECTIVE CROSS SECTION FOR THE INTERACTION OF NEUTRONS WITH $Li^6$ AND $Li^7$ NUCLEI IN THE ENERGY RANGE FROM 10 TO 450 KEV. G. V. Gorlov, B. M. Gokhberg, V. M. Morozov, and G. A. Otroshchenko. Doklady Akad. ~~Nauk S.S.S.R.~~ 110, 963-5(1956) Oct. 21. (In Russian)

Results of the experiments showed the full effective cross section for $Li^7$ reached the maximum value $\sigma_t^{max}$ = 7.0 ± 0.2 barns at $E_{res}$ ≈ 275 kev; for $Li^6$ the $\sigma_t^{max}$ = 9.5 ± 0.2 barns at $E_{res}$ = 265 kev. The increase in the full effective cross sections of neutrons in small energy ranges has been explained by the reaction $Li^6(n,t)He^4$. Tabulations are given for neutron energy values showing the relation of the energy to the thickness of the tritium target and to the angular distribution of neutrons leaving the target and captured in a recording counter. The tables of $Li^6$ and $Li^7$ full effective cross sections as well as the full cross-section curve made in relation to the energies of neutrons are presented. (R.V.J.)

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1747
AUTHOR KOTLYPIN, E.A., MOROZOV, V.M.
TITLE The Estimation of the Upper Limit of the Cross Section of the Radiation Capture of Neutrons with the Resonance Energy (275 keV) by the Isotope $Li^7$.
PERIODICAL Dokl.Akad.Nauk, 111, fasc.2, 331-333 (1956)
Issued: 1 / 1957

The authors used the continuous registration of β-decay acts of $Li^8$ when irradiating lithium with neutrons. On this occasion the momenta caused by the α-particles of $Be^8$ decay are separated from momenta caused by the products of the reaction of $Li^6(n,t)He^4$. The α-decay of the $Be^8$ even occurs in the ground state within $\sim 10^{-16}$ sec, so that, from the experimental point of view, this process may be considered as simultaneous with the β-decay of $Li^8$. The measuring device consisted of two gas counters. The inner counter (of usual construction) operates as a proportionality counter, its walls are covered with a thin layer of lithium fluoride with a content of natural isotopes. The exterior counter registers the electrons of the β-decay of $Li^8$ and operates as a GEIGER counter; its construction is illustrated by a drawing. On these conditions the efficiency of the registration of the β-decay of $Li^8$ (with respect to the registration of $Li^6(n,t)He^4$) depends only on the absolute efficiency of the counting of the electrons of the β-decay of $Li^8$ by the exterior counter. The efficiency of the exterior counter attains $50 \mp 10\%$. Thus, the number of β-decay acts of

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1934
AUTHOR GORLOV,G.V., GOCHBERG,B.M.. MOROZOV,V.M., OTROŠČENKO,G.A.
TITLE Measuring the Cross Section of the Reaction $Li^6(n,t) He^4$ in the Interval of Neutron Energies of from 9 to 700 keV.
PERIODICAL Dokl.Akad.Nauk 111,fasc.4,791-794 (1956)
Issued: 1 / 1957

The authors carried out these measurements at the beginning of 1955 following measurements of the total cross section of the interaction between monoenergetic neutrons and $Li^6$- and $Li^7$-nuclei. The monoenergetic neutrons were obtained in the aforementioned energy interval from the reaction $T(p,n)He^3$. The tritium was contained in the titanium-cover of a molybdenum target. Measurements were carried out in a 3 x 3 x 2,5 m cabin the walls of which consisted of a mixture of paraffin and boron. At from 0 to 80° the background amounts to not more than some percents of the primary neutron flux. At large angles ( $\geq$ 140°) the background attained a noticeable part (up to 60%) of the primary neutron flux. For measuring the relative course taken by the cross section of the reaction $Li^6(n,t)He^4$ the authors constructed a spiral-shaped ionization chamber with small dimensions. For the measuring of the absolute value of the cross section of $Li^6(n,t)He^4$ three plane ionization chambers are produced; they contain technical argon with a pressure of $\sim 4$ at, and have an operation voltage of $\sim 350$ V. The pulse characteristics of these plane ionization chambers were fully satisfactory. Carrying out measurements is discussed in short.

Measuring results are illustrated in form of a diagram. The cross section attains its maximum value of 3,4 ± 0,3 barn at a neutron energy of 265 keV and decreases towards smaller neutron energies (at $E_n$ < 50 keV). The extrapolation in to the thermal energy domain of the neutrons according to the law 1/v is not in contradiction to the known value of the cross section of the reaction $Li^6(n,t)He^4$ in the case of thermal neutrons. These results agree well with corresponding American results (BLAIR and HOLLAND) with respect to the maximum amount of the cross section and with respect to the shape of the curves, but there is a difference of 15 keV as regards the position of the maximum.

At a neutron energy of 265 keV resonance is essentially caused by the p-interaction between the neutrons and the $Li^5$ nucleus, i.e. the interference effect between s-interaction and potential interaction is not strongly marked. Therefore, the total cross section $\sigma_t$ of the interaction between neutrons and $Li^6$ can in the vicinity of resonance, without any grave erros, be expressed by the sum of the cross section $\sigma_o$ of potential interaction and the cross section corresponding to resonance.

INSTITUTION:

GORLOV, G.V., LEBEDEVA, N.S., and MOROZOV, V.M., (Acad. [illegible]

"[illegible]"

[illegible] Nuclear Reactions in Medium and
Low Energy Physics, Moscow, 1-27 Nov 57.

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Phys
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Angular distribution of neutrons from the reaction $T(p,n)He^3$. O. V. Gorlov, B. M. Gokhberg, V. M. Morozov, and V. A. Shigin. *Soviet Phys. Tech. Phys.* 1, 664-9(1957)(English translation).—See *C.A.* 50, 15281*d*.
B. M. R.

MOROZOV, V.M.

Nonmolecular light scattering in the high atmospheric layers. V. M. Morozov. *Mem. soc. roy. sci. Liege* 18, 70-8 (1957).—A theoretical treatment of scattering due to aerosols. Harry C. Allen, Jr.

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20-5-26/67

AUTHOR: MOROZOV, V.M.

TITLE: ~~On the Nonmolecular~~ Scattering in the High Layers of the Atmosphere.
(O nemolekulyarnom resseyanii sveta v vysokikh sloyakh atmosfery. Russian).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 5, pp 1039 - 1042 (U.S.S.R.)

ABSTRACT: First of all some relevant preliminary papers are quoted. If the atmosphere is horizontally homogeneous, then (at monochromatic light with the wavelength λ ) the equation of the searchlight sounding with consideration of the weakening of the light in the atmosphere reads as follows:

$$\alpha_{\lambda}(h) = \alpha_{0,\lambda}(h)\exp\left[\mathcal{X}\int_0^{\lambda}\alpha_{\lambda}(h)\,dh\right]$$

Here $\alpha_{\lambda}$ stands for the coefficient of the scattering in the altitude h, β and ω for the angles of the elevation of the device and of the searchlight, respectively. We furthermore have $\mathcal{X} = (1/\sin\beta) + (1/\sin\omega)$. A photometer with a photoelement that was attached in the focus of a searchlight mirror served as light receiver. First of all a formula for the scattering coefficient is given which is valid at the following simplified conditions: a) The

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On the Nonmolecular Scattering in the High Layers of the Atmosphere.

searchlight beam has small angular dimensions and its image lies completely on the photocathode. b) The sensitivity at the surface of the photocathode is constant. But actually these conditions are not realized: a) The beam of the projector consists of a light narrow ray - the ray proper - and of a relatively weak but wide hinterground which ranges to angles of about 40 degrees. b) The sensitivity along the photocathode is not constant. This hinterground is taken into consideration by the introduction of an additional term $E'_\beta$ into the equation of the searchlight sounding.

This term is small as compared to the other terms of this equation. The approximate and the accurate expressions $\alpha_1(h)$ and $\alpha_2(h)$ of the scattering coefficient, as found by the solution, are given. Then these expressions are transformed. With the aid of the method described here, it is possible to eliminate the influence of the multiple scattering of light.

The results of the determination of $\alpha_1 = \alpha_1(h)$ from the data of three searchlight measurements are compiled in a diagram for the effective wavelength $\lambda = 0.485\mu$, and are briefly discussed. Up to an altitude of 30 and obviously even 40 km above the surface of the earth, there was noticed in the scattered beam of the search-

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On the Nonmolecular Scattering in the High Layers of the Atmosphere.

light the existence of a nonmolecular scattering of light (4 reproductions, 1 chart).

ASSOCIATION: Institute for Physics of the Atmosphere, Academy of Sciences of the USSR.

PRESENTED BY: V.G. FESENKOV, on 15 December 1956

SUBMITTED: 15 December 1956

AVAILABLE: Library of Congress

Card 3/3

SOV/120-59-2-45/50

AUTHORS: Brovchenko, V.G., and Morozov, V.M.

TITLE: Circuit for Protecting against Electrical Noise (Skhema zashchity ot elektricheskikh pomekh)

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 2, pp 145-146 (USSR)

ABSTRACT: In nuclear studies where pulses are to be counted at a very slow rate external interference can be troublesome. The present arrangement (Fig 1) blocks a number of channels when a false pulse is received. The action is reliable if: the sensitivity is greater to interference than of any controlled circuit; speed of response in blocking is greater than that during ordinary operations; the blocking time is such that interfering pulses both of greater amplitude and duration are frustrated. The main amplifier in Fig 1 has two sections each of three stages, the gain is 900, the passband 1 kc/s at 2.5 mc/s. The maximum output signal is 50 V and is positive. The output pulses are standardised in amplitude (120 V) and duration (0.6 μ) by the blocking oscillator $\text{Л}_2$ in Fig 2. The pulse is stretched in the Schmidt trigger $\text{Л}_5$ and applied to the cathode follower $\text{Л}_8$ which drives all

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Circuit for Protecting against Electrical Noise

the gates (1-10). The portion of the circuit to the right of the dotted line in Fig 2 is a gate. The arrangement has worked reliably for a number of years.

Card 2/2 There are 2 figures.

SUBMITTED: November [illegible]

SOV/49-59-2-21/25

AUTHORS: Belyunova, A. D. and Morozov, V. M.

TITLE: On Photoelectric Measurement of the Night Glow of the Sky
(O fotoelektricheskikh izmereniyakh svecheniya nochnogo neba)

PERIODICAL: Izvestiya Akademii nauk SSSR Seriya geofizicheskaya,
1959, Nr 2, pp 321-325 (USSR)

ABSTRACT: The purpose of the photoelectric measurements of the night glow of the sky is a determination of light emission λ 5577, 5893, 6300 Å and of the band OH . However, the interpretation of the results of the measurements becomes complicated due to the continuous spectrum of the sky caused by the diffusion of light in the lower atmosphere. To overcome these difficulties the authors suggest an application of the specially calibrated photometers which could differentiate between the two factors: a continuous constant and a linear radiation. This can be done when the diffusion in the lower atmosphere is considered as Eq (1), where, instead of the usual coefficients of filters (Refs 1 and 2), a transmission width of the filter Δλ is taken which is an equivalent of the coefficient of transmission $k_\lambda$ of the wave λ ($B_\lambda$ - brightness of radiation in quants $cm^{-2} sec^{-1}$; $b_\lambda$ - general brightness in quants $cm^{-2} sec^{-1}$ and $Å^{-1}$,

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[illegible]/49-59-[illegible]-21/[illegible]

On Photoelectric Measurement of the Night Glow of the Sky

Δω - angle of photometer ΔS - surface of objective, $c_\lambda$ - coefficient of proportion). Therefore, for calibrating the photometer, the values of $E_\lambda$, $c_\lambda$ and $\Delta\lambda$ should be known for every $\lambda$ and $\Delta\omega \cdot \Delta S$. Thus for the photometer for measuring the night sky the expression ( ) should be solved ($E_{0\lambda}$ star illumination [illegible]) when the atmospheric conditions [illegible] measured star illumination in [illegible] conditions). In order to obtain

$$B'_\lambda = B_\lambda + b_\lambda \Delta\lambda$$

the expressions (5) can be calculated from the Eqs (1) and (2). Generally, the radiations $B_\lambda$ and $b_\lambda$ of the different $\Delta\lambda$ could be obtained when two photometers are employed but the measurements will differ in proportion to $b_\lambda / B_\lambda$ [illegible] cause the difference could be considerable (Table 1). In [illegible] cases

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SOV/49-59-2-11/25

On Photoelectric Measurement of the Night Glow of the Sky

the ratio of two measurements of the different $\Delta\lambda$ will be constant: 1) when the linear radiation can be determined ($B'_\lambda = 0$, $\lambda$, say 550 Å) and the effective wavelengths in both photometers are equal, then a relation $\Delta\omega 1/\Delta\omega 2$ can be obtained from Eq (4) (1 and 2 - first and second photometers); 2) when the continuous radiation (atmospheric diffusion) does not exist. Then the ratio of two measurements of the linear radiation $\Delta\lambda_1/\Delta\lambda_2$ can be found from Eq (5). The absorption $B'$ can be defined as a sum of absorptions $I_H$, $E_{o\lambda}$, $\Delta\lambda$, $\Delta\omega$ and $J_o$, when the relation:

$$\frac{\Delta J_o}{J_o} = \frac{\Delta J}{J} + \Delta\tau\varkappa$$

takes place ( $\tau$ - optical thickness, $\varkappa$ - 1/sin h, h > 10°). The absorption of an individual observation $B'$ can be determined as.

$$\frac{\Delta B'}{B'} = 8\% + \frac{\Delta E_{0\lambda}}{E_{0\lambda}} .$$

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On Photoelectric Measurement of the Night Glow of the Sky

The precision of the photometers becomes a major factor in obtaining the high accuracy of the measurements based on these calculations. Table 2 shows an example of the deviations which were obtained (Columns 3 and 4) when the various filters were used. One of the best photometers, [illegible], was designed by [illegible] Kilchnikov. Results of the measurements obtained by this photometer are shown in Fig 1, showing an error of less than 5%. The calibrating of the photometer can only be done in a condition of constant radiation. This can be determined by the [illegible] method when the formula:

$$I_H = \frac{I_{бД} - kI_{мД}}{1 - c_k}$$

can be employed ( $I_{бД}$ or $I_{мД}$ - readings at large and small diaphragms, $c_k = I_{мД}/I_{бД}$ ). The author conveyed his

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SOV/49-59-2-21/25

On Photoelectric Measurement of the Night Glow of the Sky

gratitude to N. S. Khlebnikov for the use of his photometer, V. S. Shifman for constructional details of photometers and M. A. Yermolayev for operating the photometers. There are 2 tables, 1 figure and 4 references, 3 of the references are English and 1 is Soviet.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery (Academy of Sciences USSR, Institute of Physics of the Atmosphere)

SUBMITTED: June 27, 1958.

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21(7) SOV/89-6-4-8/27

AUTHORS: Gorlov, G. V., Gokhberg, B. M., Morozov, V. M., Otroshchenko, G. A., Shigin, V. A.

TITLE: The Fission Cross Sections for $U^{233}$ and $U^{235}$ Under the Action of Neutrons With Energies From 3 to 800 kev (Secheniya deleniya $U^{233}$ i $U^{235}$ pod deystviyem neytronov s energiyey ot 3 do 800 kev)

PERIODICAL: Atomnaya energiya, 1959, Vol 6, Nr 4, pp 453-457 (USSR)

ABSTRACT: The neutrons were obtained from the $T(p,n)He^3$-reaction, the proton energy amounting to 1200, 1400 and 1600 kev. The measuring chamber, the construction of the target, the neutron detector, and measurement of the angular distribution of the T(p,n)He-reaction are described by reference 2. Determination of the dependence of the fission cross section on neutron energy was carried out in two stages. First, only the relative course of fission cross section dependence was determined. Next, the absolute value of $\sigma_f$ for 270 kev neutrons was measured, and with this reference value the relative curves were re-calculated. Results are graphically represented and show the following limits:

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SOV/89-6-4-3/27

The Fission Cross Sections for $U^{233}$ and $U^{235}$ Under the Action of Neutrons With Energies From 3 to 800 kev

| $E_n$ | $\sigma_f(U^{235})$ | $\sigma_f(U^{233})$ |
|---|---|---|
| 3.4 kev | 4.8 b | 7.5 b |
| 780 kev | 1.05 b | 1.9 b |

Accuracy of neutron energies at $E_p$ = 1200 kev

| | | | | |
|---|---|---|---|---|
| $E_n$ = 3.4 kev | ± 0.8 kev | for $U^{235}$ | ± 0.7 kev | for $U^{233}$ |
| 200 kev | ± 28 kev | | ± 17 kev | |
| 340 kev | ± 13 kev | | ± 9.3 kev | |

Accuracy of neutron flux measurement: ~ 2-3% (at neutron energies of 9 and 3.4 kev it however amounted to 6 and 14% respectively). Accuracy of the measurement of the relative course of the fission cross section curve: ~4% for $U^{235}$ and ~6% for $U^{233}$ (except in the case of neutron energies of 3.4 kev - 16%, 9 kev - 9%, 30 kev - 6%, for $U^{235}$ and $U^{233}$ correspondingly 19, 11, and 9%). Sum errors in absolute $\sigma_f$-determination: $U^{235} \sim 7\%$, $U^{233} \sim 8\%$.

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SOV/89-6-4-8/27

The Fission Cross Sections for $U^{233}$ and $U^{235}$ Under the Action of Neutrons With Energies From 3 to 800 kev

The results obtained agree well with previously obtained data, but it must be born in mind that the present work was carried out already in 1953-1954. There are 3 figures and 5 references, 4 of which are Soviet.

SUBMITTED: September 25, 1958

Card 3/3

32998

S/641/61/000/000/[illegible]
B102/B1[illegible]8

26.2242

AUTHORS: Zubov, Yu. G., Lebedeva, N. S., Morozov, V. M.

TITLE: Inelastic neutron scattering at [illegible] Mev in [illegible]

SOURCE: Krupchitskiy, P. A., ed. Neytronnaya fizika; sbornik [illegible]
Moscow, 1961, 298-305

TEXT: The cross sections of the reaction $Be^9(n,2n)Be^8$ were measured in dependence on the energy of the bombarding neutrons. The neutron source was a deuterium gas target irradiated by electrostatically accelerated deuterons. The proportional gas counters ($BF_3$) were arranged in three concentric rings of 9, 18 and 27 counters (Fig. 1). The pulses from the counters were recorded by radio with a coincidence time resolution of 200 µsec. For neutron spectra scattered elastically in carbon the efficiency of the detector was 5.5, 4.5 and 4.4 for neutrons of [illegible] and 4.5 Mev, respectively. The total cross section $\sigma_t$ was taken as the sum of the elastic scattering cross section $\sigma_e$, the cross section $\sigma_{2n}$ of the (n,2n), and $\sigma_\alpha$ of the (n,α), reactions. $\sigma_e$ and $\sigma_{2n}$ were determined

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32298
S/641/61/000/[illegible]
B102/B1[illegible]

Inelastic neutron scattering at

from the number of counts with the Be and with a standard specimen, and from coincidence counts. $\sigma_{2n}$ was found to be 0.[illegible] ± 0.[illegible], 0.[illegible] ± 0.[illegible], 0.[illegible]3 ± 0.07 and 0.4[illegible] ± 0.0[illegible] barn for $E_n$ = 3.2, 3.7, 4.[illegible] and [illegible] Mev respectively. The results indicate that the (n,2n) reactions [illegible] cascade processes (n; n', n"). The first stage is an inelastic [illegible] scattering with formation of an excited state of $Be^9$ (excitation [illegible] 2.43 Mev). Deexcitation leads to neutron emission and formation of [illegible] L. G. Kondrat'yev and L. A. Molodov are thanked for assistance. There are 3 figures and 12 references: 2 Soviet and 10 non-Soviet. The [illegible] recent references to English-language publications read as follows: Hughes, Schwartz Neutron Cross Sections. N. Y., [illegible]; Stelson, [illegible] Campbell, E. C. Phys. Rev. 106, [illegible] ([illegible]); Fischer, [illegible] 99, (19[illegible]7); G. Weber et al. Phys. Rev. 104, [illegible] (19[illegible]6).

Fig. 1. Experimental arrangement. Legend: (1) neutron [illegible] (2) paraffin collimator, ([illegible]) cadmium filter, ([illegible]) specimen, [illegible] block of detector, (6) gas counters, ([illegible]) paraffin container, [illegible] amorphous boron

Card 2/[illegible]

32705
S/049/61/000/012/009/009
D207/D303

3,1810 (1041)

AUTHOR: Morozov, V.M.

TITLE: Some photometric data on the continuous nightglow emission

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1961, 1887 - 1894

TEXT: The author discusses published work on the continuous spectrum of nightglow and reports data obtained by absolute photometry of the spectral region near the Na line at 5893 Å. The observations were made during the I.G.Y. at the Zvenigorodskaya nauchnaya stantsiya Instituta fiziki atmosfery AN SSSR (Zvenigorod Scientific Station, Institute of Physics of the Atmosphere, AS USSR) located at $55^{\circ}43'$ N, $36^{\circ}46'$ E. The observations were taken at the beginning of each hour in the zenith direction. The photometer was calibrated as described earlier by A.D. Bolyunova and V.M. Morozov (Ref. 8: Izv. AN SSSR, ser. geofiz. no. 2, 1959). The following conclusions were drawn from the

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[illegible]

S/049/61/000/012/009/009
D207/D303

Some photometric data

results. (1) The intensity of continuous (background) nightglow varied from 0.85 to 4.3 Rayleigh units per 1 Å and mean intensity was [illegible] Rayleigh / Å; (2) the ratio of the background near the lines at [illegible] and 5890 Å changed very little, if at all, with season and with the overall background intensity; (3) the ratio of the background intensities near 5280 and 5890 Å was similar to the distribution of energy from the sun; (4) the variation of the background intensity was not correlated with variations of the Na 5893 Å radiation or with variations of the OH (8, 2) bands, indicating independent causes for the three types of radiation. Acknowledgments are made to A. A. Kuznetsova and to staff members of the Design Office of the Institut fiziki atmosfery (Institute of Physics of the Atmosphere) V. G. Alekseyev and [illegible] Filippova for their help in calculations, and to N. N. Shefov for [illegible] trographic data. There are 7 figures, 4 tables and 11 references: 7 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: F. E. Roach and A. [illegible] Me[illegible], [illegible] Astrophys. J. [illegible], no. [illegible] (1955); F. E. Roach, "Instruct[illegible] IV, Aurora and airglow", Pergamon Press, London, 1955; [illegible]

Card 2/3

S/049/61/000/012/009/009
D207/D303

Some photometric data ...

and L. H. Meredith, J. Geophys. Res., 65, no. 1, ([illegible])

ASSOCIATION: Institut fiziki atmosfery, Akademiya nauk SSSR (Institute of Physics of the Atmosphere, Academy of Sciences, USSR)

SUBMITTED: July 10, 1961

Card 3/3

S/049/62/000/004/003/003
D207/D301

9,11,2

AUTHOR: Morozov, V.M.

TITLE: Non-constancy of the continuous spectrum of the night-sky emission

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya no. 4, 1962, 573 - 576

3

TEXT: The paper is a detailed answer to N.N. Shefov (Ref. 1: Izv. AN SSSR, ser. geofiz., no. 12, 1961) and V.I. Krasovskiy (Ref 6: Izv. AN SSSR, ser. geofiz., no. 12, 1961), who criticized the present author's conclusions (Ref. 7: Izv. AN SSSR, ser. geofiz., no. 12, 1961) that the night-sky emission near 5280 and 5830 Å is similar to the continuous emission of class G2 stars, and that there are no large variations with time in the continuous spectrum of the night sky. There are 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Institut fiziki atmosfery, Akademiya nauk SSSR (Institute of Physics of the Atmosphere, Academy of Sciences of the USSR)

SUBMITTED: January 2, 1962

Card 1/1

41433

S/120/62/000/005/005/036
E039/E420

AUTHOR: Morozov, V.M.

TITLE: An optical method of measuring the average energy of ions accelerated by an electrostatic generator

PERIODICAL: Pribory i tekhnika eksperimenta, no.5, 1962, 33-34

TEXT: The method makes use of the Doppler shift in the wavelength of light emitted by excited neutral atoms or ions obtained from the beam of accelerated ions by means of neutralization or dissociation. For example, if the displacement of a component of the $H_\beta$ doublet is measured (by comparison with an iron arc) with an error not exceeding $5 \times 10^{-3}$ Å it follows that the average velocity of a beam of neutral hydrogen atoms with $V/C = 5 \times 10^{-2}$ can be determined with an error not greater than $2 \times 10^{-5}$. This method is much simpler and cheaper than an electrostatic analyser and makes use of a commercially available spectrograph. It should also allow the further development of electrostatic generators as highly stable sources of accelerated particles with accurately known energy. The best accelerators of this type at the present moment can produce accelerated ions of

Card 1/2

An optical method of measuring ... S/120/62/000/005/005/036
E039/E420

constant average energy with an error of not more than 1 to 2 x $10^{-4}$ of a given value.

SUBMITTED: December 9, 1961

Card 2/2

37?57

S/049/62/000/00[illegible]/[illegible]/[illegible]
D207/D304

AUTHORS: Morozov, V.A., Solyunova, A.B. and Yermolayev, [illegible]

TITLE: On calibrating photoelectric measurements of weak light sources

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 6, 1962, [illegible]

TEXT: During the IGY the authors measured photoelectrically the night-sky emission using, as light standards, two lumino-phors ФK-100 (FK-100) activated with radioactive nuclides $Cs^{137}$ (phosphor No. 1) and $Sr^{90}$ (phosphor No. 2). The phosphors were developed and prepared at the Laboratoriya lyuminestsentsii Fizicheskogo instituta im. P.N. Lebedeva AN SSSR (Luminescence Laboratory, Physics Institute imeni P.N. Lebedev, AS USSR). The present paper reports a study of the variations of the intensity of emission of these two phosphors with temperature and with time. The temperature varied from about -5°C to about +40°C. Before measurements, the phosphors were kept at each of these temperatures for several

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[illegible]
B207/B304

On calibrating photoelectric ...

[illegible] in order to reach equilibrium. It was found that at a certain emission wavelength λ* (5550 Å for phosphor No. 1 and < 5230 Å for No. 2) there was no change of the emission intensity on heating from -30°C to +60°C. At λ < λ* the change was negative (a decrease), and at λ > λ* the change was positive (a rise). If sufficient time was not allowed for the phosphors to reach equilibrium, then a temperature rise produced first a fall of the emission intensity, followed by a slow rise to the equilibrium [illegible] at λ = λ*. The [illegible] [illegible] [illegible] [illegible] sensitive activators: 15-35% fall (varying with the [illegible]) [illegible] of phosphor No. 1 after 11 months; 10-15% [illegible] for No. 2 also after 11 months. If such variations [illegible] and temperature are allowed for, the phosphors can be used as [illegible] light sources suitable for calibration of photocells. The authors thank V.L. Levshin and L.A. Pakhomicheva for supplying the phosphor materials and for advice. There are 1 figure and 2 tables.

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On calibrating photoelectric ... S/049/62/000/010/002/002
D207/D304

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery
(Institute of Physics of the Atmosphere AS USSR)

SUBMITTED: January 14, 1962

Card 3/3

MOROZOV, V.M.

Some features of the emission of [O1] 5577 and the continuum of luminescence in the night sky. Izv. AN SSSR. Ser.geofiz. no.10: 1446-1449 O '62. (MIRA 16:2)

1. Institut fiziki atmosfery AN SSSR.
(Night sky)

381[illegible]

S/049/62/000/012/001/001
D207/D308

AUTHOR: Morozov, V.M.

TITLE: Influence of the light scattering effect in a real atmosphere on the observed night airglow intensity

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya geofizicheskaya, no. 12, 1962, 1837-1842

TEXT: Simultaneous measurements of the night-airglow intensity and the transparency of the atmosphere were carried out at the Zvenigorodskaya nauchnaya stantsiya instituta fiziki atmosfery AN SSSR (Zvenigorod Scientific Station of the Institute for Physics of the Atmosphere, AS USSR) during the period of the IGY and the International Geophysical Cooperation Year. The transparency was deduced from the reduction in the light received from the Pole Star and the optical thickness $\tau$ of the atmosphere was calculated from the transparency. A statistical analysis of the airglow intensity I at $\lambda\lambda$ 4270 and 5280 Å showed a complete lack of any dependence of I on $\tau$ for $\tau$ varying in the range $\Delta\tau$ = 1-2. This indicated

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Influence of the light ... S/049/62/000/012/001/001
D207/D308

that as the direct absorption of airglow emission in the atmosphere increased (i.e. $\tau$ increased) the loss in the intensity I was fully compensated by the predominantly forward scattering on aerosol particles (e.g. water drops) of radius $r \gtrsim \lambda$, where $\lambda$ is the airglow wavelength. Acknowledgements are made to G.V. Rozenberg for his advice and A.A. Kuznetsova for her help in computations. There are 4 figures and 2 tables.

ASSOCIATION: Akademiya nauk SSSR, Institut fiziki atmosfery (Academy of Sciences of the USSR, Institute for Physics of the Atmosphere)

SUBMITTED: May 28, 1962

Card 2/2

ZAKATOV, Petr Sergeevich, prof.; MOROZOV, V.P., prof., retsenzent;
[illegible], A.I., dots., retsenzent; [illegible], G.F., red.

Course in higher geodesy; spheroidal geodesy, theoretical geodesy, and the elements of gravimetry (Kurs vysshei geodezii; sferoidicheskaia geodeziia, teoreticheskaia geodeziia i osnovy gravimetrii. Izd. 3., dop. i ispr. Moskva, Izd-vo "Nedra," 1964. 503 p. (MIRA 17:8)

ACCESSION NR: AP4039015 S/0055/64/000/003/0070/0074

AUTHOR: Morozov, V. M.

TITLE: A case of stability of nonsteady state motion of a gyroscope on a plane

SOURCE: Moscow. Universitet. Vestnik. Seriya 1. Matematika, mekhanika, no. 3, 1964, 70-74

TOPIC TAGS: motion stability, gyroscope, angular velocity, perturbed motion, horizontal plane

ABSTRACT: The author studies the problem of motion of a heavy hard body resting on a spherical base on a fixed horizontal plane. Without going into the technical possibility of realizing such motion, he studies a simplified formulation of the problem in the case when slipping friction can be neglected and the moment of the forces of resistance, proportional to the vertical component of the angular velocity of the gyroscope, has an essential affect on the motion of the gyroscope. He gives the conditions for stability of perturbed motion in various cases. Orig. art. has: 7 formulas and 1 figure.

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ACCESSION NR: AP4039015

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet; Kafedra teoreticheskoy mekhaniki(Moscow State University, Department of Theoretical Mechanics)

SUBMITTED: 29Oct63 DATE ACQ: 09Jun64 ENCL: 00

SUB CODE: ME NO REF SOV: 005 OTHER: 002

Card 2/2

S/0049/64/000/004/0604/0614

ACCESSION NR: AP4033025

AUTHOR: Morozov, V. M.

TITLE: The spectral distribution of radiation of the night sky in the continuous spectrum and photoelectric observations of variations in emission intensities of [OI] 5577 and NaD

SOURCE: AN SSSR. Izvestiya. Seriya geofizicheskaya, no. 4, 1964, 604-614

TOPIC TAGS: radiation, night sky, continuous spectrum, photoelectric observation, NaD

ABSTRACT: The author has examined the latest experimental data on spectral distribution of radiation of the night sky in the continuous spectrum and has investigated the different sources of error in photoelectric observation of the emission intensity of [OI] 5577 and NaD. To explain the radiation from the night sky and the emission of NaD he has proposed two reactions: 1) $NO + O \rightarrow NO_2 + h\nu$, and 2) $NaO^* + O \rightarrow Na^* + O_2$. Reaction (1) gives rise to radiation chiefly from 5500 to 6500 Å, however, with a maximum near 6000 Å. Since atoms of oxygen

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ACCESSION NR: AP4033025

participate in these reactions, some correlation ought to be observed between radiation intensity in the continuous spectrum and emission of NaD. According to the data obtained, the maximum intensity in continuous radiation near 6000 Å is not observed, and radiation in the continuous spectrum does not correlate with the emission of NaD. A dust "envelope" around the earth has been recently established, and a considerable increase in streams of cosmic particles has been recorded. But supplementary data are needed to test the long-held hypothesis concerning the possible role of scattered solar light. It should be noted, on the opposite side, that the similarity to intensity distribution of G2 may also indicate simply that radiation in the continuous spectrum depends but weakly on wavelength. "In conclusion, the author expresses his thanks to A. A. Kuznetsova for her great assistance in the computations." Orig. art. has: 4 figures, 2 tables, and 2 formulas.

ASSOCIATION: none

| | | |
|---|---|---|
| SUBMITTED: 30May63 | DATE ACQ: 13May64 | ENCL: 00 |
| SUB CODE: ES | NO REF SOV: 018 | OTHER: 002 |

Card 2/2

S/0049/64/000/005/0787/0793

ACCESSION NR: AP4038150

AUTHOR: Morozov, V. M.

TITLE: Primary scattering of light at twilight

SOURCE: AN SSSR. Izv. Seriya geofizicheskaya, no. 5, 1964, 787-793

TOPIC TAGS: light scattering, twilight, crepuscular ray, earth shadow, brightness

ABSTRACT: Primary scattering of light at twilight takes place in a rather narrow layer of air above the earth's shadow, forming the so-called crepuscular rays. The author seeks to determine the brightness of this primary scattering on a plane vertical to the sun at some angle to the horizon when the sun is at some other angle below the horizon. Refraction is neglected. Beginning with an expression for the scattering coefficient in air, the author derives, on geometrical considerations, the resulting brightness. This may be expressed in the integral form

$$\int dB = q_{\lambda} \frac{1}{\sin\gamma} \ldots e^{-\kappa_0 \tau_{\infty}} \frac{\ldots}{4\pi} \ldots \frac{1}{\kappa - \kappa_0 \ldots} \int_0^{(\kappa-\kappa_0 \ldots)\tau_0} y^{r-1} e^{-y} dy ,$$

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ACCESSION NR: AP4038159

where $q_{h'}$ is the scattering ratio at height h' [that is $\alpha(h')/\alpha(0)$], $\gamma$ is the angle of scattering, $E_{0\lambda}$ is the energy arriving from the sun, $\kappa_0$ is the Bonporad function in the direction of observation, $\kappa$ is the coefficient of change in optical thickness, $\tau_0$ is the optical thickness, and r is the [illegible] ratio (sine of angle between reference plane and direction of sun divided by sine of scattering angle). The author notes that within the range of sun angles from 0 to 6°, when observing twilight at the zenith and toward the sun, scattering of all orders beginning with the second have little effect on total twilight intensity. Scattering of higher orders may generally be neglected when observations of twilight are made from sufficient height. Orig. art. has: 1 figure, 3 tables, and 26 formulas.

ASSOCIATION: none

SUBMITTED: 29May63 DATE ACQ: 12Jun64 ENCL: 00

SUB CODE: ES,OP NO REF SOV: 007 OTHER: 001

Card 2/2

ACCESSION NR: AP4040708 S/0203/64/004/003/0470/0478

AUTHOR: Morozov, V. M.

TITLE: Some features of extraterrestrial and terrestrial components of illumination in the night sky

SOURCE: Geomagnetizm i aeronomiya, v. 4, no. 3, 1964, 470-478

TOPIC TAGS: night sky, airglow, photoelectric method

ABSTRACT: In this analysis the author neglects zodiacal light and assumes that radiation in the night sky consists of two components: terrestrial (changing with time and depending on zenith scattering) and extraterrestrial (independent of time). Photoelectric measurements of the night sky at the zenith and at the pole, made in 1959 at 55°43' north latitude (near Zvenigorodka) for several parts of the spectrum, have permitted determination of intensity variations of the extraterrestrial component of radiation in a continuous spectrum, as this depends on sidereal time. The author determined the average spectral composition and the deviation of the part of the extraterrestrial component of continuous radiation at the zenith that depends on galactic coordinates. For 1959 the correlation factor between changes

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ACCESSION NR: AP4040708

in terrestrial radiation at the zenith and at the pole reached 0.97-0.99. Small standard deviations in evaluating emissions of [OI] 5577 Å and NaD exceed noise levels and are responsible for the separation in space and in time of radiation measured at the zenith and at the pole. "In conclusion, the author expresses his thanks to A. A. Kuznetsova for her great assistance in making the computations." Orig. art. has: 6 figures, 5 tables, and 5 formulas.

ASSOCIATION: Institut fiziki atmosfery* AN SSSR (Institute of Physics of the Atmosphere, AN SSSR)

| | | |
|---|---|---|
| SUBMITTED: 30May63 | | ENCL: 00 |
| SUB CODE: ES | NO REF SOV: 006 | OTHER: 005 |

MOROZOV, V.M.

Use of fluorescence and capillary fluorescence analysis in identifying some species of actinomycetes. Antibiotiki 9 no.12:1048-1053 D '64.
(MIRA 18:7)

1. Leningradskiy nauchno-issledovatel'skiy institut antibiotikov.

MOROZOV, V.M.

Case of stability of the unsteady motion of a top on a plane. Vest. Mosk. un. Ser.1:Mat., mekh. 19 no.3:70-74 My-Je '64. (MIRA 17:6)

1. Kafedra teoreticheskoy mekhaniki Moskovskogo universiteta.

L 11456-65 EWT(m) DIAAP/SSD/ASD(a)-5/AFWL/AFETR/ESD(gs)/ESD(t)

ACCESSION NR: AP4046371 S/0020/64/158/003/0574/0577

AUTHORS: Gorlov, G. V.; Lebedeva, N. S.; Morozov, V. M. B

TITLE: Elastic scattering of polarized neutrons 19 by the nuclei Be-9, C-12, Co-59, Ni-62, Se-80, Nb-93, Cd-114, In-115, Sn-118, I-127, Pb, and Bi-209

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 574-577

TOPIC TAGS: neutron scattering, polarization, elastic scattering, angular distribution, scattering cross section, diffraction pattern, spin orbit interaction, polarizability

ABSTRACT: The authors report briefly the main experimental results of the elastic scattering of polarized neutrons with energy 4.00 ± ± 0.05 MeV. The differential cross sections for elastic scattering were measured in a plane perpendicular to the direction of the neutron polarization vector, in a scattering angle range from 10 to 170°

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L 11456-65
ACCESSION NR: AP4046371 6

left and right of the direction of the scattered-neutron beam. The measurements were made in steps of 10° with a resolution of 4°. The polarized neutron source was the reaction d(d, n)$He^3$ ($E_d$ = 1200 ± ± 50 keV). The scattering substances were in the form of cylinders 20--25 mm in diameter and 60 mm high. The scattered neutrons were detected with 6 scintillation counters arranged in symmetrical pairs relative to the beam of the scattered neutrons. Corrections were introduced for various background effects. Plots of the angular distributions of the scattering cross section and of the polarization are presented. The angular dependence of the differential cross sections exhibits a typical "diffraction" character and varies smoothly with variation of the atomic weight. The observed appreciable polarizability indicates that the spin-orbit interaction plays an important role in the elastic scattering of the neutrons at the energy employed in the experiment. Although the results do not confirm the assumption made by L. S. Rodberg (Nucl. Phys. v. 15, 72, 1960) that the polarizability should vanish at the maxima

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L 11456-65

ACCESSION NR: AP4046371 2

and minima of the differential cross sections, some correlation between the two quantities is observed, and it can be stated that the number of times that the polarizability goes through zero is equal to the number of extrema of the differential cross section for the scattering of unpolarized neutrons. This report was presented by A. P. Aleksandrov. Orig. art. has: 2 figures.

ASSOCIATION: Institut atomnoy energii im. I. V. Kurchatova Akademii nauk SSSR (Institute of Atomic Energy, Academy of Sciences SSSR)

SUBMITTED: 07Apr64 ENCL: 00

SUB CODE: NP NR REF SOV: 001 OTHER: 002

Card 3/3

L 23247-66 EWT(d)/EWT(l)/EPF(n)-2 IJP(c)

ACC NR: AT6001563

SOURCE CODE: UR/3136/65/000/927/0001/0008

AUTHOR: Morozov, V. M.

ORG: Institute of Atomic Energy im. I. V. Kurchatov (Institut atomnoy energii)

TITLE: On the nature of the temperature dependence of the radiation in the Mossbauer effect

SOURCE: Moscow. Institut atomnoy energii. Doklady, IAE-927, 1965. O prirode zavisimosti energii izlucheniya v messbauer-effekte ot temperatury, 1-8

TOPIC TAGS: Mossbauer effect, temperature dependence, line shift, relativistic quantum mechanics, Doppler effect

ABSTRACT: The author reviews the customary explanation for the decrease of the average energy radiation in the Mossbauer effect with rise in the temperature of a solid, namely, that it is due to the so-called transverse Doppler effect or to relativistic time retardation. It is shown that the Doppler effect cannot account for the observed dependence of the average radiation energy on the temperature, since, in spite of the widely held erroneous opinion, it leads theoretically to an increase in the average energy of radiation with increasing means square velocity of the displacement of the radiator, whereas in actual experiments the

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L 20387-66
ACC NR: AT6001563

average radiation energy decreases with rise in the solid-body temperature. It is noted that the absence of a thermal Doppler shift in the Mossbauer effect refutes the concept of the vibration of atoms in the crystal lattice, similar to that of the classical pendulum. An equally negative result is obtained when an attempt is made to connect the decrease in the average energy in the Mossbauer effect with rising temperature by attributing it to the relativistic contraction of the time. The only aspects of the Mossbauer effect that can be explained with the aid of the Doppler effect is the behavior of the solid in space as a unit, i.e., without excitation of the structure of the solid. Orig. art. has: 8 formulas.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 002/ OTH: 004

Card 2/2

L 52733-65 EWT(d)/EWT(m)/EWP(w)/ Pg-4 IJP(c) EM

ACCESSION NR: AP5014095 UR/0055/65/000/003/0059/0064

**AUTHOR:** Morozov, V. M. 23

**TITLE:** Problem of stability of vertical rotation of a top on a plane with consideration of viscous resistance 22 B

**SOURCE:** Moscow. Universitet. Vestnik. Seriya 1. Matematika, mekhanika, no. 3, 1965, 59-64

**TOPIC TAGS:** stability, differential equation 16

**ABSTRACT:** The author considers

$$\begin{aligned}
&\frac{dx_s}{dt} = p_{s1}x_1 + \dots + p_{sn}x_n + X_s(t, x_1, \dots, x_n, y_1, \dots, y_k, z_1, \dots, z_m) \\
&\qquad (s = 1, \dots, n), \\
&\frac{dy_l}{dt} = Y_l(t, x_1, \dots, x_n, y_1, \dots, y_k) \quad (l = 1, \dots, k), \qquad (1), \\
&\frac{dz_j}{dt} = q_{j1}z_1 + \dots + q_{jm}z_m + \varphi_j(t, y_1, \dots, y_k, z_1, \dots, z_m) + \\
&\quad + \psi_j(t, y_1, \dots, y_k) + Z_j(t, x_1, \dots, x_n, y_1, \dots, y_k, z_1, \dots, z_m) \\
&\qquad (j = 1, \dots, m),
\end{aligned}$$

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L 52733-65

ACCESSION NR: AP5014095

where $p_{sr}(t)$, $q_{j\ell}(t)$ are real continuous bounded functions of t, $\varphi_j$, $\psi_j$, $Z_j$, $Y_i$, $X_s$ are holomorphic in $x_1,\ldots,x_n$, $y_1,\ldots,y_k$, $z_1,\ldots,z_m$, with coefficients which are bounded functions of t. He shows that under certain conditions the 0 solution of (1) is stable, which solves the problem of stability of a given top with simultaneous influence of viscous friction force and the indicated moment of the forces of resistance. He shows that the condition of stability is the same as in a previous paper (Ob odnom sluchaye ustoychivosti neustanovivshegosya dvizheniya volchka na ploskosti. "Vestn. Mosk. un-ta", ser. matem., mekh., No. 3, 1964). Orig. art. has: 19 formulas.

ASSOCIATION: Kafedra teoreticheskoy mekhaniki, Moskovskiy gosudarstvennyy universitet (Chair of Theoretical Mechanics, Moscow State University)

SUBMITTED: 01Apr64 ENCL: 00 SUB CODE: ME,AS

NO REF SOV: 004 OTHER: 000

Card 2/2

L 38953-65 EWT(1)/EWG(v)/FCC/EEC(t) Po-4/Pe-5/Pq-4/Pt-10/Pi-4 GW
ACCESSION NR: AP5010272 UR/0203/65/005/002/0294/0298

37
B

AUTHOR: Morozov, V. M.

TITLE: Some space and time characteristics of 5577 Å [OI] airglow

SOURCE: Geomagnetizm i aeronomiya, v. 5, no. 2, 1965, 294-298

TOPIC TAGS: night airglow, night airglow emission, night sky luminescence, upper atmosphere emission, airglow intensity

ABSTRACT: On the basis of photoelectric data compiled by F. E. Roach (Geophysical Monograph 2. Geophysics and the IGY. Amer. Geophys. Union, 1958) during the IGY and IGC from simultaneous measurements made at two stations, Haute Provence and Tamanrasset Stations, located on practically the same longitude and at several Japanese stations, variations in the 5577 Å [OI] airglow intensity were investigated. Data obtained confirm the existence of a close relationship between 5577 Å [OI] airglow intensity variations measured in different, relatively distant points of the night sky. The correlation coefficients between the 5577 Å [OI] intensities from the Haute Provence and Tamanrasset Stations during specific time intervals have been found to decrease relatively slowly. These

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L 38953-65

ACCESSION NR: AP5010272

0

results are considered to be in general agreement with those obtained by S. Silverman and F. Ward (J. Geophys. Res. 1962, v. 67, no. 13). Orig. art. has: 2 tables and 1 figure. [DM]

ASSOICATION: none

SUBMITTED: 11May64 ENCL: 00 SUB CODE: ES,AA

NO REF SOV: 001 OTHER: 006 ATD PRESS: 3227

mel

Card 2/2

MOROZOV, V.M.

Problem of the stability of the vertical spinning of a [illegible] in a [illegible] with allowance for viscous resistance. Vest. Mosk. un. Ser. 1: Mat., mekh. 20 no.3:59-64 My-Je '65. [illegible]

1. Kafedra teoreticheskoy mekhaniki Moskovskogo gosudarstvennogo universiteta imeni M.V.Lomonosova.

MOROZOV, V.M.; NOMESTNIKOVA, V.P.

Using luminescence and capillary-luminescence analyses for primary identification of the cultures of Actinomyces levoris cultures. Mikrobiologiia 34 no.3:533-538 My-Je '65. (MIRA 18:11)

1. Leningradskiy nauchno-issledovatel'skiy institut antibiotikov.

L 46766-66 EWT(1)/FCC GW

ACC NR: AP6030082 SOURCE CODE: UR/0362/66/002/008/0835/0843

AUTHOR: Morozov, V. M.

ORG: none

TITLE: Certain features of singly reflected light during twilight

SOURCE: AN SSSR. Izvestiya. Fizika atmosfery i okeana, v. 2, no. 8, 1966, 835-843

TOPIC TAGS: light reflection, twilight, spectral distribution, atmospheric optics, optic brightness, light polarization

ABSTRACT: The author analyzes theoretically the intensity ditribution and the variation of the spectral composition of singly scattered light during twilight with increasing depression of the sun below the horizon. The study covers the brightness of the singly scattered light in the plane of the solar meridian as a function of the zenith angle, the solar depression, and the wavelength. The effects of external factors such as the presence of outer-space dust in the upper atmosphere, the optical density (height) of the atmosphere, and the polarization of the light are described. The time lag between the sinking of the sun below the horizon and the increase in the angle of the earth's twilight shadow in the antihelion direction is discussed from the point of view of the obtained brightness distribution of the singly scattered light. The results are compared with experimental and theoretical data obtained by others. Orig. art. has: 4 figures and 17 formulas. [02]

SUB CODE: 04, 20/ SUBM DATE: 10Mar66/ ORIG REF: 009/ OTH REF: 002/
ATD PRESS: 5091

Card 1/1 UDC: 551.593.55

Morozov V. N.

SOV 89- . . - 15

AUTHORS: Leypunskiy, A. I., Abramov, A. I., Andreyev, V. N., [illegible] A. I., Bondarenko, I. I., Galkov, V. I., Golubev, V. I., [illegible] A. D., Guseynov, A. G., Kazachkovskiy, O. D., Kozlova, N. V., Krasnoyarov, N. V., Kuz'minov, B. D., Morozov, V. N., Nikolayev, M. N., Smirenkin, G. N., Stavisskiy, Yu. Ya., Ukraintsev, F. I., Usachev, L. N., Fetisov, N. I., Sherman, L. Ye.

TITLE: Investigations of the Physics of Reactors With Fast Neutrons II (Issledovaniya po fizike reaktorov na bystrykh neytronakh) (Continued from abstract 6/15)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 3, pp. 284-295 (USSR)

ABSTRACT: The reactivity and the kinetics of the reactor were measured. It could be shown that in the center of the active zone the weight of the 5 MeV neutrons is higher by ~15% than that of 250 MeV neutrons. The effective yield of the delayed neutrons in the reactor with a uranium shield exceeds that of a reactor with a copper shield by 1,4 times its amount.

Reactor [illegible] 5:

The active plutonium zone is the same as in reactor БР-[illegible]. In the center of the reactor a water-uranium channel is provided which is separated from the plutonium zone by a uranium layer

Card 1/[illegible]

of 8 cm thickness. The uranium-water lattice consists of cylindrical slugs of normal uranium, which have a diameter of 35 mm. The canning material is aluminum. The ratio between water and uranium is 0,55. The lattice spacing is [illegible] mm. Measurements carried out with the water-uranium lattice instead of with the pure uranium layer showed:

1) The conversion factor is reduced from 2,45 ± 0,[illegible] to 1,7 ± 0,2.

2) In the case of a fixed power output of the active zone the velocity with which the total quantity of plutonium [illegible] and uranium 235 is formed was increased by 35%.

3) The velocity with which plutonium is produced increased [illegible] 1,8 times its amount.

4) In the case of a fixed power output of the active zone [illegible] total power output of the reactor is increased by [illegible] times its amount.

Reactor [illegible]-2:

This reactor was described more in detail in references [illegible] and 15. Its nominal power output is 120 kW, the maximum output is 200 kW. In the active zone of the reactor БР-2, which consists of plutonium rods, mercury is used as a coolant, which takes up

Card 2/[illegible]

~1% of the total volume of the active zone. The regulating rods (interior of shield) are made from a [illegible] alloy. The external shield consists of uranium slugs canned with stainless steel. Thickness ~[illegible] cm. The uranium shield is surrounded by copper of 15 cm thickness. The presence of mercury in the active zone leads to a decrease of the content of fast neutrons in the spectrum. The conversion factor was 1,6 ± 0,2. Theoretically the kinetic equation for this reactor was calculated by G. I. Marchuk according to the method developed by V. S. Vladimirov. Theoretical calculation of the critical mass was carried out with an error of 4%, and that of the effectiveness of the regulating rods with an error of [illegible]. The effective yield of the delayed neutrons was found to amount to [illegible] while the experimental value was 0,4 ± [illegible]. [illegible] figures, 1 table, and 15 references. [illegible]

Card 3/[illegible]

MoRozov, V.N.

21(4) PHASE I BOOK EXPLOITATION SOV/2583

International Conference on the Peaceful Uses of Atomic Engergy. 2nd, Geneva, 1958.

Doklady sovetskikh uchenykh; yadernyye reaktory i yadernaya energetika. (Reports of Soviet Scientists; Nuclear Reactors and Nuclear Power) Moscow, Atomizdat, 1959. 707 p. (Series: Its: Trudy, vol. 2) Errata slip inserted. 8,000 copies printed.

General Eds.: N.A. Dollezhal, Corresponding Member, USSR Academy of Sciences, A.K. Krasin, Doctor of Physical and Mathematical Sciences, A.I. Leypunskiy, Member, Ukrainian SSR Academy of Sciences, I.I. Novikov, Corresponding Member, USSR Academy of Sciences, and V.S. Fursov, Doctor of Physical and Mathematical Sciences; Ed.: A.P. Alyab'yev; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This book is intended for scientists and engineers engaged in reactor designing, as well as for professors and students of higher technical schools where reactor design is taught.

COVERAGE: This is the second volume of a six-volume collection on the peaceful use of atomic energy. The six volumes contain the reports presented by Soviet scientists at the Second International Conference on Peaceful Uses of Atomic Energy, held from September 1 to 13, 1958 in Geneva. Volume 2 consists of three parts. The first is devoted to atomic power plants under construction in the Soviet Union; the second to experimental and research reactors, the experiments carried out on them, and the work to improve them, and the third, which is predominantly theoretical, to problems of nuclear reactor physics and construction engineering. Yu. I. Koryakin is the science editor of this volume. See SOV/2081 for titles of all volumes of the set. References appear at the end of the articles.

## PART II. EXPERIMENTAL AND RESEARCH REACTORS

Leypunskiy, A.I., V.G. Grabin, M.N. Aristarkhov, I.I. Bondarenko, O.D. Kazachkovskiy, O.I. Lyubimtsev, S.A. Pashkov, M.S. Pinkhasik, K.K. Renne, Yu.Ya. Stavisskiy, F.I. Ukraintsev, L.N. Usachev, and E.A. Stumbur. Experimental Fast Reactors in the USSR (Report No. 2129) 215

Kikoin, I.K., V.A. Dmitriyevskiy, I.S. Grigor'yev, Yu.Ya. Gasanov, S.V. Keremovkskiy, and B.G. Dubovskiy. Pilot-plant Reactor With Volatile and Fissionable $UF_6$ (Report No. 2502) 232

Goncharov, V.V. and et al. Some New and Rebuilt Thermal Research Reactors (Report No. 2185) 243

Brokhovich, B.V., F.Ya. Ovchinnikov, V.I. Klimenkov, P.V. Glazkov, and G.M. Doltahnyuk. Dismantling an Experimental Graphite-uranium Isotope Producing Reactor After Four Years of Operation (Report No. 2297) 319

Feynberg, S.M., Ye. D. Vorob'yev, V.M. Gryazev, V.B. Klimentov, N.Ya. Lyashchenko, and V.A. Tsykanov. An Intermediate Reactor for Obtaining High Intensity Neutron Fluxes (Report No. 2142) 334

## PART III. PHYSICS AND ENGINEERING OF REACTOR DESIGN

Leypunskiy, A.I., A.I. Abramov, V.N. Andreyev, A.I. Baryshnikov, I.I. Bondarenko, V.I. Galkov, V.I. Golubev, A.D. Gul'ko, A.A. Guayenov, O.D. Kazachkovskiy, N.V. Kozlova, N.V. Krasnoyarov, B.D. Kuz'minov, V.N. Morozov, M.N. Nikolayev, G.N. Smirenkin, Yu. Ya. Stavisskiy, F.I. Ukraintsev, L.N. Usachev, N.I. Petit, D.F. Sherman. Research on the Physics of Fast Neutron Reactors (Report No. 2038) 377

Dyakov, V.N. and B.L. Ioffe. Homogeneous Natural Uranium Reactor (Report No. 2296) 398

Feynberg, S.M., Ye. S. Antsiferov, V.P. Katkov, L.V. Komissarov, T.K. Levina, Yu. V. Nikol'skiy, A.N. Novikov, V.S. Osmachkin, G.A. Stolyarov, and Ya. V. Shevelev. Fuel Burn Up in Water-water Power Reactors and Experiments With the Uranium Water Lattice (Report No. 2145) 411

Sidorenko, V.A. Self-regulation in a Water-water Power Reactor (Report No. 2186) 534

199

[illegible]

Physical [illegible]

Report [illegible]
[illegible], Vienna, [illegible]
[illegible] I. [illegible]

[illegible]

MOROZOV, V.N.

S/089/61/011/006/002/014
B102/B153

21.1000

AUTHORS: Leypunskiy, A. I., Abramov, A. I., Aleksandrov, Yu. A., Anikin, G. V., Bondarenko, I. I., Guseynov, A. G., Ivanov, V. I., Kazachkovskiy, O. D., Kuznetsov, V. F., Kuz'minov, B. D., Morozov, V. N., Nikolayev, M. N., Sal'nikov, O. A., Smirenkin, G. N., Soldatov, A. S., Usachev, L. N., Yutkin, M. G.

TITLE: Investigation of the БР-5 (BR-5) fast reactor (spatial and energy distributions of neutrons)

PERIODICAL: Atomnaya energiya, v. 11, no. 6, 1961, 498 - 505

TEXT: The fast research reactor BR-5 and its experimental equipment is described in brief and some of its neutron spectra are given and discussed. The following data are given: fuel - plutonium oxide; coolant - sodium; reflector - thin layer of natural uranium plus thick layer of nickel; power - 5000 kw. The reactor has many vertical and horizontal holes for technical and physical studies and is well supplied with experimental equipment. Leypunskiy gave a detailed description of the BR-5 reactor at X

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B102/B138

Investigation of the...

the Second Geneva Conference (1958). Inside the core the neutrons have energies of more than 100 kev which they lose almost completely in passage through reflector and shield. In the outer layers of the shield, their mean energy does not exceed some tens of ev. In the kev range ($E_n > 6$ kev) spectra were measured for the most important beams and channels. For the other cases, they were determined from threshold reactions. The soft part of the spectrum within the reflector was determined from the spatial distribution of neutrons with $E_n \approx 5$ ev, recorded with gold resonance indicators. The total neutron flux was determined only at the points where the $Pu^{239}$ fission cross section was constant. Direct neutron spectrum measurements were carried out in a vertical (OK-70) and a horizontal (B-3) channel using ($He^3$+Ar)-filled ionization chamber in the first case and the neutron transmission method with n-hexane in the second. The neutron spectrum of the horizontal channel was also determined by photoemulsions. From the rates of indicator and fission reactions $Au^{197}(n,\gamma)$, $U^{235}(n,f)$, $Pu^{239}(n,f)$, $Th^{232}(n,f)$, $Na^{23}(n,\gamma)$ $Cu^{63}(n,\gamma)$, and $Al^{27}(n,\alpha)$ the abrupt

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B102/B138

Investigation of the...

drop in neutron energy in the Ni reflector was determined, and the activity caused by resonance neutrons ($E_n$ = 4.9 ev). The fast neutron flux ($E_n$ > 1.4 Mev) in the core center was found to be $(2.4 \pm 0.2) \cdot 10^{14}$, and total flux was $(8.2 \pm 0.3) \cdot 10^{14}$. Experimental results were verified by energy-group calculations (18 groups). Good agreement between theory and experiment was also found for the channel spectra. The authors thank D. S. Pinkhasik, N. N. Aristarkhov, and the reactor personnel for assistance. There are 10 figures, 2 tables, and 2 Soviet references.

SUBMITTED: August 17, 1961

Table 1. Reaction cross sections in the core center.

Legend: (1) Reaction; (2) experiment; (3) $\sigma$ calculated, given in barns.

Fig. 7.. Neutron transmission spectrum (n-hexane) for the horizontal channel B-3.

Card 3/0

KRAMNIK, V.Yu.; SEMENOV, Yu.N.; ARUTYUNOV, E.A.; MOROZOV, V.N.; DEMCHENKO, [illegible].Ya.

Chemically resistant ceramic metal filters made of sponge titanium wastes. Porosh.met. 4 no.4:86-90 Jl-Ag '64.
(MIRA 18:8)

1. Institut problem materialovedeniya AN UkrSSR, Zaporozhskoye otdeleniye.

MOROZOV, [illegible]

[illegible]

[illegible]

L 2285-66 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(z)/EWP(b)/EWA(h) IJP(c) JD/HW/DM

ACCESSION NR: AP5016928 55 UR/0089/65/018/006/0593/0601
45,B 621.039.538/539.125.52

AUTHORS: Bondarenko, I. I. (Deceased); Liforov, V. G.; Morozov, V. N.; Nikolayev, M. N.; Parfenov, V. A.; Semenov, V. A.

TITLE: Measurement of the neutron spectrum in nickel, iron, and stainless steel 16 19 21 21

SOURCE: Atomnaya energiya, v. 18, no. 6, 1965, 593-601

TOPIC TAGS: neutron spectrum, neutron energy distribution, nickel, iron, stainless steel, nuclear reactor shield, neutron cross section

ABSTRACT: The neutron spectra were measured by the time of flight method using a pulsed fast reactor (IBR) with a resolution of ~0.04 μsec/m, and with high neutron intensity ($\sim 10^7$ sec$^{-1}$). The energy region covered was that below 1 MeV. The experimental setup is shown in Fig. 1 of the Enclosure. The spectra of the neutrons passing through various thicknesses of material disclosed the presence of a

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L 2285-66

ACCESSION NR: AP5016928

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fine structure due to the resonant character of the cross section of the investigated media. A preliminary analysis of these spectra was made by comparison with multigroup calculation and calculations based on simple models, with account taken of the resonant self-screening of the cross section, shows certain discrepancies between theory and experiment, the reasons of which are briefly discussed. 'The authors thank O. D. Kazachkovskiy, L. N. Usachev, and V. V. Orlov for valuable discussions, F. L. Shapiro and Yu. S. Yazvitskiy for advice and the opportunity of using the neutron detector and the multichannel time analyzer of the Laboratory of Neutron Physics of the Joint Institute of Nuclear Research, and the IBR reactor crew headed by S. K. Nikolayev for help, and V. Z. Nozik, Z. A. Aleksandrova and L. M. Sereda for participating in the experimental data reduction.' Orig. art. has: 6 figures and 4 formulas

ASSOCIATION: None

SUBMITTED: 13Jul64 ENCL: 01 SUB CODE: NP

NR REF SOV: 017 OTHER: 005

Card 2/3

L 2285-66

ACCESSION NR: AP5016928

ENCLOSURE: 01

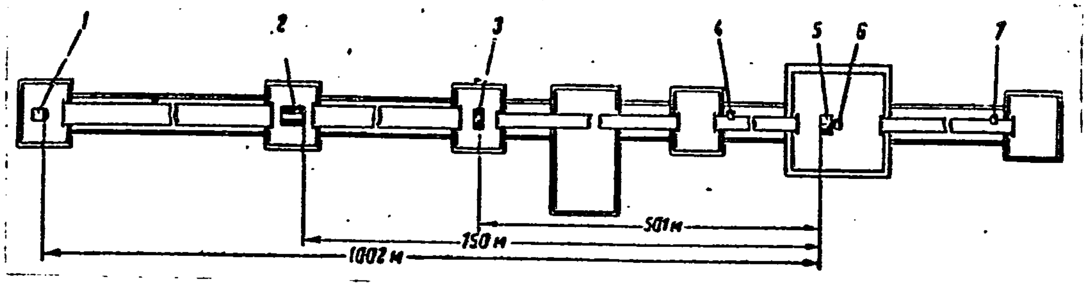

**Figure 1.** Setup of the experiment:

1 - scintillation detector; 2 - collimator; 3 - detector consisting of Born counters; 4 - monitor on a 50m base; 5 - prism made of the research material; 6 - active zone of the pulsed fast reactor (IBR); 7 - monitor on a 100m base.

Card 3/3 DP

L 21005-66 EEC(k)-2/EWA(h)/EWT(1)/FBD/T/EWP(k) IJP(c) WG

ACCESSION NR: AP5024711

UR/0056/65/049/003/0895/0904

AUTHOR: Basov, N. G.; Morozov, V. N.; Orayevskiy, A. N. 15

TITLE: Nonlinear mode interaction in a laser 25,44 B

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 3, 1965, 895-904

TOPIC TAGS: laser, stimulated emission, nonlinear optics, oscillation mode

ABSTRACT: A theoretical analysis is conducted of the operation of a two-mode solid state laser. It is shown that the mode interaction can be described by a set of rate equations and that the steady-state regime is stable. The solution of the system of equations depends on the frequency difference of the modes. The two possible cases, nearly biharmonic and nearly harmonic oscillations, are analyzed. In the case of close modes the steady-state regime may be unstable, resulting in the appearance of undamped spiking. The laser operating regime is shown to depend on the shape and position of the mirrors and the quality of the crystal. Orig. art. has: 17 formulas and 1 figure.

[CS]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics ~~Institute, Academy of Sciences SSSR)~~

Card 1/2

L 21005-66

ACCESSION NR: AP5024711

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| SUBMITTED: 03Apr65 | ENCL: 00 | SUB CODE: EC, SS |
| NO REF SOV: 010 | OTHER: 012 | ATD PRESS: 4111 |

Card 2/2 20

L 3196-66 EWA(k)/FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h) SCTB/IJP(c) WG
ACCESSION NR: AP5015414 UR/0020/65/162/004/0781/0784

AUTHOR: Basov, N. G. (Corresponding member AN SSSR); Morozov, V. N.; Orayevskiy, A. N. 44

TITLE: Dynamics of a two-mode laser 25,44

SOURCE: AN SSSR. Doklady, v. 162, no. 4, 1965, 781-784

TOPIC TAGS: laser, stimulated emission, mode, laser theory, laser cavity

ABSTRACT: A theoretical analysis is made of the operation of a two-mode laser. Simple substitution is used to obtain an equation containing the polarization and the electric field from a set of equations for a one-mode laser. The equation obtained can be expanded in terms of the eigenfunction of the field. Two special cases are considered: 1) eigenfrequencies much greater than the width of each of the resonance lines and oscillations occurring at both frequencies (nearly biharmonic oscillations) and 2) resonance curves overlapping considerably (nearly harmonic oscillations). In the case of nearly biharmonic oscillations, application of van der Pol equations to the system of equations obtained by the authors results in a set of rate equations which, under certain simplifying assumptions, are identical to those obtained by W. E. Lamb (Physical Review, v. 134, no. 6A, 1964, p. 1429).

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L 3196-66

ACCESSION NR: AP5015414

In the case of nearly harmonic oscillations, application of van der Pol equations leads to a set of equations for slow oscillations. An analysis of the resulting equations shows that the intensity of emission consists of regular undamped oscillations and explains some of the experimentally observed operating regimes. However, the actual regime is much more complex and requires analysis of the interaction of a larger number of modes. Orig. art. has: 5 formulas and 1 figure.

[CS]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR) 44

SUBMITTED: 04Jan65 ENCL: 00 SUB CODE: EC

NO REF SOV: 003 OTHER: 006 ATD PRESS: 4041

Card 2/2

L 17985-66 FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(h) IJP(c) WG
ACC NR: AP6006804 SOURCE CODE: UR/0386/66/003/001/0054/0058

AUTHOR: Belenov, E. M.; Markin, Ye. P.; Morozov, V. N.; Orayevskiy, A. N.

50
48
B

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Interaction between traveling waves in a ring laser 25,44

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 1, 1966, 54-58

TOPIC TAGS: gas laser, ring laser, helium neon laser, laser R and D, traveling wave interaction

ABSTRACT: An investigation of beat frequencies in traveling waves generated in a ring laser on a rotating platform may be used for highly accurate analysis of the spectral, statistical, and other characteristics of laser emission. However, frequency splitting $\Delta$ of the traveling waves takes place only at rates of rotation $v$ greater than some critical velocity $v_{cr}$ (or the corresponding quantity $\Delta_{cr}=2kV_{cr}/\pi$, where $v$ is the linear velocity of a resonator mirror, $k$ is the wave vector). Coupling between traveling waves causes mutual synchronization at frequencies below the critical value which results in single-frequency conditions. The authors studied

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ACC NR: AP6006804

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the quantity $\Delta_{cr}$ as a function of the parameters of a ring laser. A helium-neon laser was used in this experiment ($\lambda=3.39\ \mu$). A spectral analyzer was used for measuring the beat frequency $\Delta$. The capture band $\Delta_{cr}$ was studied as a function of the coefficient of transmission for the output mirror. A reduction in transmission causes a sharp change in the capture band. Experiments were conducted on attenuation of the beam reflected from the external mirror by using a filter. Attenuation of this signal reduces the capture band. Various optical systems were used for passing the direct and reverse beams to the photoelectric mixer with a simultaneous reduction in the energy reflected into the resonator from the external mirrors. Figures are given showing two modifications of systems for reducing the capture band to 300 cps. The $Q$ of the resonator was reduced for a further reduction of the band. This was done by replacing one of the opaque mirrors in the resonator with a semi-transparent mirror. The result was a reduction in the capture band from 300 to 50 cps at the same output power. The magnitude of the capture band is determined by the reverse reflection of energy from various elements in the resonator, scattering by nonhomogeneous media, and the nonlinear dependence of polarization on the field. "The authors are grateful to N. G. Basov for valuable consultation and interest in the work and to V. V. Gromov for assistance in carrying out the experiment." Orig. art. has: 2 figures, 2 formulas.

[14]

SUB CODE: 20/ SUBM DATE: 23Nov65/ ORIG REF: 002/ OTH REF: 003/ ATD PRESS: 4213

Card 2/2

ACC NR: AP6024504 SOURCE CODE: UR/0181/66/008/007/2256/2258

AUTHOR: Morozov, V. N.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Generation due to traveling waves

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2256-2258

TOPIC TAGS: gas laser, traveling wave interaction, solid state laser, laser emission

ABSTRACT: Investigations of the pulsation of traveling waves appearing in a ring-type gas laser make possible highly accurate studies of the spectral, statistical, and other characteristics of laser emission. An experimental study of a solid-state ring laser shows that it acquires some characteristics which distinguish it from lasers with Fabry-Perot type resonators. The present author examines the interaction of traveling waves in a solid-state laser. The following expression is found for the frequency of harmonic oscillations:

$$\omega = \omega_n + \frac{\gamma}{\gamma + h_l}\delta, \qquad (1)$$

where $\delta = \frac{\omega_n - \omega_l}{\omega_l}$ is the frequency difference of the natural frequency of the resonator from the center of the emission line. The deviation of the oscillation frequency from the natural

Card 1/3

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ACC NR: AP6024504

frequency of the resonator has the same form as that in lasers with Fabry-Perot resonators. It is noted that Eq. (1) differs from the effect obtained for the high ~~delay~~-manifested in the splitting of the emission frequency (B. L. Zhelnov, A. P. Kazantsev, V. S. Smirnov, FTT, 7, 2816, 1965). No such effect is observed in the region of applicability of the equation obtained in the present work:

$$\left.\begin{aligned}\ddot{x}_i+2\gamma\dot{x}_i+\Omega^2x_i&=-2ky_i,\\ \ddot{y}_i+2h_1\dot{y}_i+y_i&=-2h_1\left[(1-\mu_iw_i-\mu_{12}w_j)x_1-\mu_{12}w_{12}x_j\right],\\ \dot{w}_i+hw_i&=-2h(\dot{y}_i+2h\;y_i)x_i,\\ \dot{w}_{12}+hw_{12}&=-2h\sum_{1,2}(\dot{y}_i+2h_1y_i)x_j,\quad i=1,\,2,\quad i\neq j,\end{aligned}\right\}\qquad(2)$$

where $t'=\omega_1 t$, $x_i=\frac{d_{12}E_i}{\hbar}(T_2T_1)^{1/2}$, $y_i=\frac{P_i}{d_{12}R_0}\left(\frac{T_1}{T_2}\right)^{1/2}$, $w_i=\frac{R_i}{R_0}$, $w_{12}=\frac{R_{12}}{R_0}$, $\Omega=\frac{\omega_n}{\omega_1}$, $2\gamma=\frac{1}{Q}$, $h_1^{1}=\omega_1T_2$, $h^{-1}=\omega_1T_1$, $2k=4\pi R_0d_{12}^2\hbar^{-1}T_2$, $\mu_1=\int u^4dV$, $\mu_2=\int v^4dV$, $\mu_{12}=\int u^2v^2dV$, $\mu_1=\mu_2=\mu$, and the normalized eigen functions (u, v) satisfy the condition

$$E(x,t)=\sum_n\left[E_{1n}(t)\,u_n(x)+E_{2n}(t)\,v_n(x)\right],\qquad(3)$$

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where

$$u_n \sim \sin k_n x, \quad v_n \sim \cos k_n x.$$

Orig. art. has: 8 formulas.

[26]

SUB CODE: 20/ SUBM DATE: 31Jan66/ ORIG REF: 004/ OTH REF: 004/ ATD PRESS: 5063

L 42128-66 F?? [illegible](1)/EEC(k)-[illegible]T [illegible](k) IJP(c) JG

ACC NR: AP6026934 (A, N) SOURCE CODE: UR/0141/66/009/004/0710/0714

AUTHOR: Morozov, V. N.; Orayevskiy, A. N.

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TITLE: Synchronization of spiking in lasers 25

SOURCE: IVUZ. Radiofizika, v. 9, no. 4, 1966, 710-714

TOPIC TAGS: laser R and D, laser theory, solid state laser

ABSTRACT: A. J. De'Maria et al. discovered experimentally (J. Appl. Phys., v. 34, 1963, 453) that regular pulsation of the radiation power with a frequency of an external force is obtainable in a laser by means of a periodic modulation of losses in its resonator. The present article offers a theoretical analysis of this phenomenon. The fundamental equations of a Q-switched laser are replaced by this approximate nonlinear conservative equation: $\ddot{x}+x(1+x)-\frac{\dot{x}^2}{1+x}=0$; the motion integral of this equation is: $\dot{x}^2=(1+x)\,|C+2\ln(1+x)-2x|$, this integral defines the phase trajectories of the equation and permits solving

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the equation by quadratures. This equation takes into account interactions between modes and contains stable maximum cycles. The maximum cycles are due to small nonlinear losses which depend on the amplitude of oscillations and which arise as a result of modes interaction. In the case of a ruby, the nonlinear losses that amount to about 0.0001 radiation loss through the mirrors may result in a stable maximum cycle. This cycle may be interpreted as a result of a mutual synchronization between phase-shifted modes. Several maximum cycles can arise in a multimode model, depending on the relations between the modes. Depending on phase relations, various time-intensity relations are possible. With random phase relations, the output will be irregular. "The authors wish to thank N. G. Basov for a useful discussion and V. I. Bespalov for his critical comments." Orig. art. has: 1 figure and 25 formulas.

[03]

SUB CODE: 09 / SUBM DATE: 29Nov65 / ORIG REF: 005 / OTH REF: 004/ ATD PRESS: 5062

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L 45127-66 EWT(m)/EWP(e) WH
ACC NR: AP6026977 SOURCE CODE: UR/0051/66/021/002/0230/0232

47

AUTHOR: Morozov, V. N.

ORG: none

TITLE: Amplification of spontaneous emission in a medium with population inversion

SOURCE: Optika i spektroskopiya, v. 21, no. 2, 1966, 230-232

TOPIC TAGS: laser theory, spontaneous emission, population inversion, PHOTON EMISSION, RUBY LASER

ABSTRACT: Amplification of spontaneous emission was investigated for the case of a homogeneous ruby rod whose length was much greater than its diameter and which was pumped uniformly over its entire volume. The problem was limited to a one-dimensional approximation with the assumption that the photons which are emitted spontaneously over the $4\pi$ steradians are propagated predominantly along the rod in two possible directions. The amplification of spontaneous emission was described by a system of nonlinear partial differential equations. The results indicate that in the case of short rods, gain per pass increases exponentially with length at first, decreasing subsequently due to an increase in the probability of dumping of active particles by the spontaneously emitted photons. At higher amplification of the

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ACC NR: AP6026977

spontaneous emission, the total gain of the crystal linearly depends on length. At pumping intensities of 5—10, increase in gain with length is effective from 15—20 cm, and at intensities of 10—20 from 10—15 cm. At increased rod lengths the average gain per unit length decreases monotonically, thus indicating the advantage of using a series of small noninterchangeable crystals instead of one long one to achieve higher gains. The problem becomes highly complicated when crystal shape, reflection, transmission, and scattering are accurately known. In such cases the proposed single model can be considered as a first approximation of the problem. Orig. art. has: 1 figure and 2 formulas. [YK]

SUB CODE: 20/ SUBM DATE: 22Aug64/ OTH REF: 002

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L 27661-66 EEC(k)-2/EWA(h)/EWP(k)/EWT(l)/FBD/T IJP(c) WG

ACC NR: AP6008288 SOURCE CODE: UR/0109/66/011/003/0514/0518

44
B

AUTHOR: Morozov, V. N.; Orayevskiy, A. N.

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TITLE: Effect of irregularity of radiation of molecules on maser frequency
25

SOURCE: Radiotekhnika i elektronika, v. 11, no. 3, 1966, 514-518

TOPIC TAGS: maser, maser theory

ABSTRACT: In explaining why maser frequency changes on introduction of a second molecular beam, K. Shimoda, et al., believe that the traveling wave is connected with the energy flow into the output waveguide (Phys. Rev., 1956, v. 102, 1308; J. Phys. Soc. Japan, 1961, v. 16, no. 9, 1728). The present article disputes this point and offers a different explanation for the "traveling-wave effect". It points out that even when the output waveguide is absent, the maser frequency deviates due to irregularity (or nonuniformity) of molecule flight in the resonator, with or without saturation. The field nonuniformity in a two-beam system is lower roughly by two orders of magnitude than in the one-beam system. "The authors wish to thank N. G. Basov for the problem statement and discussions." Orig. art. has: 1 figure and 15 formulas.

SUB CODE: 20 / SUBM DATE: 09Dec64 / ORIG REF: 002 / OTH REF: 002

Card 1/1 UDC: 621.317.766.1.001.5

L 29555-66 EEC(k)-2/EWP(k)/EWT(1) EBD/T IJP(c) WG

ACC NR: AP6018052 SOURCE CODE: UR/0020/66/168/003/0550/0553

AUTHOR: Basov, N. G. (Corresponding member AN SSSR); Morozov, V. N.; Orayevskiy, A. N

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B

TITLE: Contribution to the theory of undamped pulsations of laser intensity

25

SOURCE: AN SSSR. Doklady, v. 168, no. 3, 1966, 550-553

TOPIC TAGS: laser emission, solid state laser, laser pulsation, phase diagram, light pulse

ABSTRACT: The differential equation for the intensity of laser emission, which in the case of solid-state lasers reduces to an equation whose stable limiting cycle corresponds to undamped oscillations of the laser emission intensity, is solved analytically. It is shown that the solutions obtained approximate quite closely the phase trajectories of the system in a case of large depth of modulation. The solution consists of two parts. The first corresponds to a slow motion when the active particles accumulate and the amplitude increases relatively slowly. The second represents an increase in amplitude followed by a release of the stored energy by radiation during a short pulse. The analytic relations obtained are used to calculate the parameters of a scheme proposed by the authors (Paper at Scientific Congress in Leipzig, March 1965) to obtain short light pulses (Fig. 1). The periodic solution of the equations

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