ALEKSANDROV, Ye.B.; BONCH-BRUYEVICH, A.M.; KHODOVOY, V.A.

Spin exchange. Izv. AN SSSR. Ser. fiz. 27 no.8:1070-1077 Ag '63. (MIRA 16:10)

ALEKSANDROV, Ye.B.; KONSTANTINOV, O.V.; PEREL', V.I.; KHODOVOY, V.A.

Modulation of scattered light by parametric resonance. Zhur. eksp. i teor. fiz. 45 no.3 503-510 S '63. (MIRA 16:10)

1. Opticheskiy institut imeni S.I. Vavilova.
(Light--Scattering) (Cadmium)

ALEKSANDROV, Ye.B.; KONSTANTINOV, O.V.; PEREL', V.I.; KHODOVOY, V.A.

Modulation of scattered light by parametric resonance. Zhur. eksp. i teor. fiz. 45 no.3:503-510 S '63. (MIRA 16:10)

1. Opticheskiy institut imeni S.I. Vavilova.
(Light—Scattering) (Cadmium)

ACCESSION NR: AP4020921 S/0051/64/016/002/0193/0200

AUTHOR: Aleksandrov,Ye.B.; Konstantinov,O.V.; Perel', V.I.

TITLE: Conversion of the frequency of modulation of light by parametric and double resonance

SOURCE: Optika i spektroskopiya, v.16, no.2, 1964, 193-200

TOPIC TAGS: modulation frequency conversion, light modulation conversion, radiation modulation, parametric resonance, double resonance, Zeeman effect, magnetic field splitting, luminescence modulation, harmonic combination, dual modulation, light scattering, cadmium

ABSTRACT: In resonance scattering of modulated light by atoms whose excited state is a Zeeman triplet, the depth of modulation of the luminescence is resonance-dependent on the splitting magnetic field; the degree of modulation exhibits a maximum when the modulation frequency agrees with the frequency of the sigma component of the line. On the other hand, in scattering of light of constant intensity (non-modulated), one can obtain modulated luminescence by applying, in addition to the constant splitting magnetic field, an alternating field perpendicular or parallel

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ACC.RN: AP4020921

to the constant one. In the former case there obtains "double resonance"; in the latter case, "parametric resonance". Modulation frequency conversion incident to parametric and double resonance is discussed and analyzed theoretically; the discussion is based on earlier publications of the authors. It is shown that incident to application of an alternating field, in addition to the constant one, there should appear in the luminescence intensity harmonics not only with the frequencies of the incident light modulation and field modulation, but also with combination frequencies. The amplitude of the combination harmonics is resonance-dependent on the strength of the constant field. The experimental part of the study was carried out on a set-up consisting of an oscillator feeding a coil via an rf amplifier, a photomultiplier, a tuned amplifier and a detector assembly. The set-up was similar to that described earlier by the authors (ZhETF,45,503,1963). Radiation associated with the $5^3P_1 - 5^1S_0$ transition in cadmium vapor (contained in a tube surrounded by the above-mentioned coil) was observed. The purpose of the experiments was not to obtain detailed data, but only to demonstrate the feasibility of modulation frequency conversion. A modulation amplitude versus field strength curve is reproduced. The experimental results are consistent with the predictions of theory. "In conclusion, the authors take pleasure in expressing their gratitude to A.M.Bonch-Bruyevich for his interest in the work and valuable advice." Orig.art.has: 51 formulas

Card 2/3

ACCESSION NR: AP4020948 S/0051/64/016/003/0377/0381

AUTHOR: Aleksandrov, Ye.B.

TITLE: Coherent excitation of atomic states by electron impact

SOURCE: Optika i spektroskopiya, v.16, no.3, 1964, 377-381

TOPIC TAGS: electron impact excitation, transition probability, coherent excitation, modulated excitation, pumping, Zeeman splitting, line shape, cadium

ABSTRACT: The present work was a continuation of earlier research by the author (Opt.i spektro.14,436,1963) and O.V.Konstantinov and V.I.Perel' (ZhETF 45, 279,1963) concerning resonance scattering of modulated light by cadmium vapor. It was established that the depth of modulation of the scattered light has a sharp maximum when the modulation frequency of the excitation coincides with the frequency of the transition between the components of the Zeeman triplet of the 5^3P_1 state of the atom in a magnetic field. The effect is attributed to interference between the terms characterized by different magnetic quantum numbers, specifically, sublevels with m = = ±1. In the present work there was investigated coherent excitation by electron impact. The experiments were carried out with cadmium vapor, the observed line being

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ACCESSION NR: AP4020948

the 3261 Å luminescence line, associated with the $5^3P_1 - 5^1S_0$ transition. The modulated electron beam (from a gun) was directed normal to the weak (≤0.5 gauss) magnetic field, which was slowly swept through the expected resonance region. The radiation was detected at 90° to the beam by means of a photomuliplier. The modulation frequencies were 1 and 2.62 Mc. The result of processing one series of measurements is shown in the Figure (Enclosure 01): the points are experimental; the solid line is the theoretical contour calculated for $g = 1.5$ and $\gamma = 5.6 \times 10^5$ sec^{-1}. (The second experimental peak is due to the presence of odd Cd isotopes in the vapor.) The advantages of the modulated beam (beats) technique over other methods for determining the probabilities for transitions associated with non-resonance lines are pointed out. "I take this opportunity to express my deep gratitude to V.A.Budnikova for assistance in realizing the electron excitation, V.S.Shevere for consultation and help with the same problem, and to A.M.Bonch-Bruyevich for his attention and interest in the work." Orig.art.has: 3 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 30May63 DATE ACQ: 02Apr64 ENCL: 01

SUB CODE: PH NR REF SOV: 004 OTHER: 002

Card 2/3

ACCESSION NR: AP4020971 S/0051/64/016/003/0533/0535

AUTHOR: Aleksandrov, Ye.B.; Kozlov, V.P.

TITLE: Contribution to the theory of modulation of luminescence appearing incident to interference of coherently excited nondegenerate states

SOURCE: Optika i spektroskopiya, v.16, n0.3, 1964, 533-535

TOPIC TAGS: beat luminescence, modulated luminescence, level interference, coherent excitation, nondegenerate system

ABSTRACT: In a series of recent papers by one of the authors (Ye.B.Aleksandrov), alone and in collaboration with other investigators (Opt.i spektr.14,436,1963; ZhETF,45,503,1963; Opt.i spektr.16,377,1964; Ibid.16,193,1964) there were described experiments in which there was observed beating of the radiation from a system of atoms characterized by close sublevels in the excited state. The beats arise as a result of interference of states. The theory of the phenomenon as regards optical excitation was developed by O.V.Konstantinov and V.I.Perel' (Opt.i spektr.16,193, 1964; ZhETF 45,279,1963) using the density matrix formalism. In the present paper there is proposed a simpler variant of the theory, which is applicable for diffe-

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ACCESSION NR: AP4020971

rent types and ranges of excitation and, in the opinion of the authors, is more physically meaningful. The approach is based on the assumptions that lifetimes of the atoms in the energetically close excited states are equal, that there is a certain probability for excitation of the atoms to the states 1 and 2 with a definite phase and amplitude relation (coherent excitation) and that the effective excitation time is much shorter than the lifetime in the excited states. Thus, there are derived formulas characterizing the luminescence beats under conditions of modulation of the excitation or of the separation between excited sublevels. Beats should also occur in the case of modulation in phase, rapid rotation of the plane of polarization, etc. "We are indebted to O.V.Konstantinov and V.I.Perel' for discussion of the work and critical remarks." Orig.art.has: 12 formulas.

ASSOCIATION: none

SUBMITTED: 30May63 DATE ACQ: 02Apr64 ENCL: 00

SUB CODE: PH NR REF SOV: 005 OTHER: 002

Card 2/2

L 17136-65 EEC(b)-2/EEG(k)-2/EWA(k)/EWP(k)/EWT(l)/T/EWA(m)-2 Pf-4/Pl-4/Pi-4/Po-4 SSD(a)/AS(mp)-2/AFWL/SSD/AFMD(t)/ASD(a)-5/RAEM(a)/RAEM(c)/ESD(c)/ESD(gs)/ESD(t)/IJP(c) JHB/WG

ACCESSION NR: AP5000559 S/0051/64/017/006/0957/0960

AUTHOR: Aleksandrov, Ye. B.

TITLE: Luminescence beats in pulsed excitation of coherent states

SOURCE: Optika i spektroskopiya, v. 17, no. 6, 1964, 957-960

TOPIC TAGS: interference effect, interference analysis, luminescence, coherent light, atomic spectrum, level transition

ABSTRACT: The author describes the most direct experiment for demonstrating free beats produced as a result of interference of two different energy states of an atom excited by a short light pulse. The theory is briefly reviewed. The experiment was performed on cadmium, using the intercombination transition $5\,^3P_1 - 5\,^1S_0$ (3,261 Å), $\tau = 2.4 \times 10^{-6}$ sec. Cadmium vapor saturated at 230° was excited with plane-parallel light from a cadmium lamp, transmitted through a pulsed modulator. The luminescence was registered at right angles to the field and to the electric vector of the exciting light, using a photomultiplier whose signal was amplified and fed to an oscilloscope. The

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ACCESSION NR: AP5000559

pulsed light modulator used the electro-optical effect in a crystal of ammonium dihydrophosphate (C. H. Billings, J. Opt. Soc. Amer. v. 39, 797, 1949). Since the signal-to-noise ratio expected from the equipment was less than unity, photographic buildup of the signal was used, by photographing the oscilloscope screen many times on a single frame. Photometry of the resultant photograph displayed the beats, which were shown to have a period 0.7 -- 0.8 μsec, which is in good agreement with the theoretical value 0.78 μsec. "The author thanks A. M. Bonch-Bruyevich for support and interest in the work." Orig. art. has 3 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: 10Aug64 ENCL: 00

SUB CODE: OP NR REF SOV: 005 OTHER: 005

Card 2/2

ALEKSANDROV, Ye.B.; BONCH-BRUYEVICH, A.M.; KOZLOV, V.P.

Observation of the signal shape in the presence of a high noise level by means of repeated oscillographing. Prib. i tekh.eksp. 10 no.5:110-113 S-O '65.

(MIRA 19:1)

1. Gosudarstvennyy opticheskiy institut, Leningrad. Submitted Aug.8, 1964.

L 3665-66 EWT(1) IJP(c)

ACCESSION NR: AP5011108 UR/0051/65/018/004/0545/0551
539.184.27: 546.48

AUTHOR: Aleksandrov, Ye. B.; Khromov, V. V. 44,55

TITLE: Use of the method of beats to measure the Stark splitting of the cadmium 5^3P_1 level

SOURCE: Optika i spektroskopiya, v. 18, no. 4, 1965, 545-551

TOPIC TAGS: Stark splitting, cadmium, resonance, luminescence, beat method, light modulation, splitting constant

ABSTRACT: The Stark splitting of the 5^3P_1 state of cadmium was investigated by observing the degree of modulation of resonance luminescence produced when cadmium vapor is excited with modulated light (the method of beats). This splitting was never investigated before by radio-optical or polarization methods, and is too small to be observed by direct spectroscopic methods. The measurements were made by two methods, one with simultaneous application of a constant electric and variable magnetic field, and the other with an electric field alone. Since the classical interpretation cannot be applied to the latter case, a general analysis of the

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L 3665-66

ACCESSION NR: AP5[illegible]8

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beat method is presented, applicable for a system of sublevels of arbitrary origin. The experimental equipment and procedure are briefly described, and the results are in satisfactory agreement with the developed theory. It is confirmed that the Stark effect is quadratic in weak fields (up to 15 kV/cm), and the splitting constant is found to be $(6.8 \pm 0.4) \times 10^{-8}$ cm/kV^2. "We thank V. A. Budnikov for much help with the work, and P. P. Feofilov, O. V. Konstantinov, and V. I. Perel' for advice and valuable criticism." Orig. art. has: 5 figures and 6 formulas.

ASSOCIATION: None

SUBMITTED: 26May64 ENCL: 00 SUB CODE: OP

NR REF SOV: 006 OTHER: 006

Card 2/2 mkl

L 9912-56 EWT(1)/EWT(m)/EPF(n)-2/EWP(t)/EWP(b) IJP(c) JD/WW/JG

ACC NR: AP5022872 SOURCE CODE: UR/0051/65/019/003/0452/0455

AUTHOR: Aleksandrov, Ye. B.

ORG: None

TITLE: Beats in luminescence due to phase modulation of the excited state

SOURCE: Optika i spektroskopiya, v. 19, no. 3, 1965, 452-455

TOPIC TAGS: luminescence, excited state, light polarization, transition radiation, phase modulation, Faraday effect, cadmium

ABSTRACT: The author describes the realization of a new method of synchronizing intensity beats in the spontaneous radiation of atoms. The method was originally proposed in an earlier paper by the author (with V. P. Kozlov, Opt. i spektr. v. 16, 533 with correction in v. 16, 1068, 1964) and consists in making the elementary process that produces the beats govern the initial phase of the beat. The experiment is based on the cadmium intercombination transition $5^3P_1 - 5^1S_0$ in a magnetic field. Cadmium vapor at 220C is escited by 3261 A resonance radiation from a cadmium lamp, directed along the magnetic field and linearly polarized (Fig. 1). The luminescence is observed at right angles to the field by means of a photomultiplier. The modulation of the initial phase was produced by oscillating the plane of polarization at high frequency with the aid of the Faraday effect in the same cadmium vapor, near the absorption line. Details of the oscillation of the plane of polarization are described in a companion paper in the same source (Opt. i spektr. v. 19, 455, 1965, Acc. AP5022873). The line shapes of the luminescence beats before and after synchronous detection, as

Card 1/2 UDC: 535.37

L 9912-66

ACC NR: AP5022872

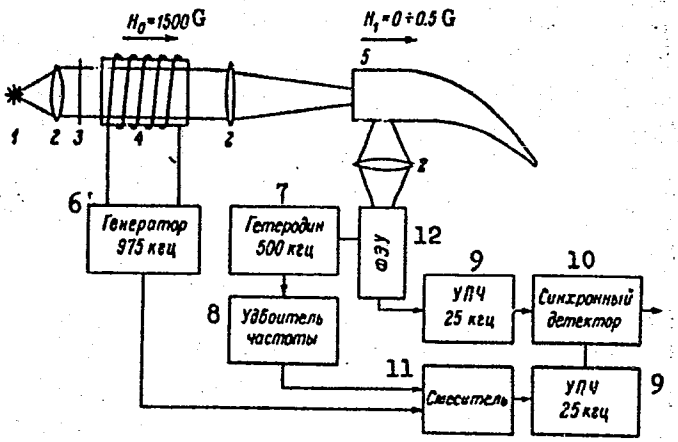

Fig. 1. Block diagram of experimental setup. 1 - Cadmium lamp, 2 - lens, 3 - polarizer, 4 - cadmium vapor cell, 5 - resonance vessel, 6 - 975 kcs oscillator, 7 - 500 kcs heterodyne, 8 - frequency doubler, 9 - 25 kcs IF amplifier, 10 - synchronous detector, 11 - mixer, 12 - photomultiplier.

well as the line widths (5×10^5 sec^{-1}) were found to agree with the published data. Author thanks A. M. Bonch-Bruyevich for advice, support, and interest in the work, and V. P. Kozlov for critical comments. Orig. art. has: 2 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 29Jan65/ ORIG REF: 010/ OTH REF: 004

Card 2/2

ALEKSANDROV, Ye.B.

Astrophysical proof of the second postulate of the special theory of relativity. Astron. zhur. 42 no.3:676-678 My-Je '65. (MIRA 18:5)

L 9911-66 EWT(l)/EWP(e)/EWT(m)/EWP(b) IJP(c) WW/GG/WH

ACC NR: AP5022873 SOURCE CODE: UR/0051/65/019/003/0455/0457

AUTHOR: Aleksandrov, Ye. B.

ORG: None

TITLE: Modulation and filtration of resonance radiation with the use of the Faraday effect

SOURCE: Optika i spektroskopiya, v. 19, no. 3, 1965, 455-457

TOPIC TAGS: cadmium, Faraday effect, resonance line, light polarization, Zeeman effect, absorption band

ABSTRACT: This is a companion to the preceding paper in the same source (Opt. i spektr. v. 19, 452, 1965, Acc. AP5022872) and describes the use of the Faraday effect in cadmium vapor to modulate and filter out the unshifted resonance lines. The purpose of the experiment was to develop a technique which can be useful in certain experiments with resonance excitation. The experiment was performed with the cadmium 3261 Å resonance line. Linearly polarized light from the cadmium lamp passed through a quartz cell placed together with an electric oven inside a coreless coil to provide a magnetic field up to 2000 gauss directed along the light beam. The magnetic field split the excited state of cadmium 5^3P_1 into a simple Zeeman triplet whose outer components produced the magnetic rotation and absorption. Maximum differential rotation of the plane of polarization could be obtained by varying the splitting and the vapor density under the given experimental conditions, and by choosing the optimum tempera-

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L 9911-66

ACC NR: AP5022873

ture and a suitable value of the field it is possible to obtain a significant modulation of the transmitted light by applying a varying magnetic field to the cell. An absorption test has shown that practically all the light produced in the system lies in the absorption band of the cadmium vapor, thus testifying to the effectiveness of the filtration. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 29Jan65/ ORIG REF: 002/ OTH REF: 001

Card 2/2

L 00541-66 EWT(1)/T IJP(c)
ACCESSION NR: AP5019221 UR/0056/65/049/001/0097/0106

AUTHORS: Aleksandrov, Ye. B.; Konstantinov, O. V.; Perel', V. I.

TITLE: Optical orientation of atoms in a magnetic field perpendicular to the beam

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 1, 1965, 97-106

TOPIC TAGS: magnetic moment, molecular beam, beam modulation, gas laser

ABSTRACT: The authors investigate theoretically and experimentally a new method of orienting gas atoms in a magnetic field perpendicular to an orienting light beam. This is done by using an alternating magnetic field in addition to a constant one, and modulating the alternating field while maintaining the beam intensity constant. It is shown theoretically that if the alternating field makes a

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small angle with the constant field, then the resultant moment precesses about the constant field and produces large constant components of the magnetic moment in the directions of the magnetic field and of the light. The theory of the process is briefly developed and expressions are derived for the total moment and its projections. To check on the theory, experiments were made on the dc and ac components of the moment projections on the light beam and on the constant field in the vicinity of the first resonance. The experiments were made with a mixture of cesium vapor and argon, using an orienting beam which was circularly polarized and contained only one long-wave component of the resonant doublet. A cesium electrodeless discharge spherical lamp served as the source. The experiment setup is described. The test results are found to be in satisfactory agreement with the theory. Plots were obtained of the depth of modulation of light on the amplitude of the alternating field, of the dc components of the moment against the constant field, and of the resonant broadening by the alternating field. Orig. art.

L 00541-66

ACCESSION NR: AP5019221

3

has: 6 figures and 16 formulas.

ASSOCIATION: Gosudarstvennyy opticheskiy institut im. S. I. Vavilova (State Optical Institute)

44,55

SUBMITTED: 16Feb65 ENCL: 00 SUB CODE: OP

NR REF SOV: 002 OTHER: 004

mlr

Card 3/3

L 8099-66 EWT(1)/EWA(h)

ACC NR: AP5027020 SOURCE CODE: UR/0120/65/000/005/0110/0113

AUTHORS: Aleksandrov, Ye. B.; Bonch-Bruyevich, A. M.; Kozlov, V. P. 42 B

ORG: State Optical Institute, Leningrad (Gosudarstvennyy opticheskiy institut)

TITLE: Observing signal shapes at high noise levels by means of multiple oscillographs 25

SOURCE: Pribory i tekhnika eksperimenta, no. 5, 1965, 110-113

TOPIC TAGS: signal to noise ratio, signal shape, signal distortion, oscillograph

ABSTRACT: Two methods are described for obtaining signal shapes on oscillograms with noise levels four times larger in amplitude than the original signal. The first method involves a cumulative photographic technique consisting of multiple exposure of the same film to a large number of oscillograph displays of the recurring signal. The film is then developed and treated photometrically, and the

Card 1/2 UDC: 621.391.828

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L 8099-66
ACC NR: AP5027020

0

original signal is recovered with great accuracy from the excessive background noise. This method is shown to be simpler and more advantageous than the stroboscopic technique presently in common use. The second method involves a cumulative photoelectric process which is a variation of the stroboscopic technique. It is based on the use of a narrow slit placed in front of the oscillograph and covered by an optical key with density gradients which can transform signal ordinates into light signals. These, in turn, pass through an RC integrating circuit and a photomultiplier which gradually increases the signal-to-noise intensity ratio. The signal is then registered on an automatic recorder. Orig. art. has: 3 figures. [04]

SUB CODE: 09/ SUBM DATE: 08Aug64/ ORIG REF: 006/ OTH REF: 003/ ATD PRESS: 4146

Card 2/2 pw

L 10789-66 FBD/EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/EPF(n)-2/T/EWP(k)/EWA(m)-2/EWA(h)/
ACC NR: AP6001660 ETC(m) SCTB /LJP(c) SOURCE CODE: UR/0051/65/019/006/0982/0984
44,55 WG/WW/WH 44,55 44,55 44,55

AUTHOR: Aleksandrov, Ye. B.; Bonch-Bruyevich, A. M.; Koutin, N. N.; Khodovoy, V. A.

ORG: none

79
B

TITLE: Stimulated Raman scattering in a selective resonator

SOURCE: Optika i spektroskopiya, v. 19, no. 6, 1965, 982-984

TOPIC TAGS: laser, Raman scattering, stimulated emission, laser cavity, Raman laser

ABSTRACT: The stimulated Raman scattering was investigated at an excitation power just above the threshold using the following three different setups: 1) a Raman cell in the resonator of a laser; 2) a longitudinal selective resonator (the term used by the authors for the case when the Raman laser resonator is in the direction of the ruby laser resonator); and 3)a transverse selective resonator (the term used for the case when the Raman laser resonator is rotated 90° from the direction of the axis of the ruby laser, i.e., a 90° off-axis Raman laser resonator). In the first setup the giant pulses were produced by a ruby crystal. Using two variable-transmission-coefficient filters (transmission coefficient 30—50% at λ = 694 mμ) the effective intensity of the 30—300 nsec-duration pulses in the resonator reached 100 Mwt/cm^2. The maximum energy per pulse was 3—4 j. Two dielectric mirrors with a transmission coefficient of 0.4% at λ = 694 mμ, 0.8% at λ 745 mμ (the fundamental

Card 1/2 UDC: 535.375+621.375.9:535

L 10789-66

ACC NR: AP6001660 0

SRS line in benzene), 40% at λ = 805 mμ (first harmonic) and 70% at λ = 875 m (second harmonic) were used in the experiments. The SRS in benzene had thresholds for a specified length of the Raman cell (l) and the laser input power. No SRS was observed at $l < 2$; however, SRS was stable for $5 < l < 60$ cm. The threshold power decreased almost linearly with increasing l. At l = 60 cm the efficiency of energy conversion reached 10% of the power in the cavity. It was observed that an increase in the energy of the pulses from the ruby 1.5—2 times above the threshold resulted in a three-order increase in SRS. In the longitudinal selective setup the additional reflector between the ruby rod and the Raman cell had a transmission coefficient of 90% at λ = 694 mμ, 10% at λ = 745 μ, and 1% at λ = 805 and 875 mμ. In this mode of operation the efficiency of energy conversion was at least as high as that in the previous case. Two higher harmonics at λ = 745 and 805 mμ which reached saturation at ~10% of the input power were observed. Results similar to those of the longitudinal setup were achieved with a transverse selective setup. However, SRS was achieved in a Raman cell the length of which along the laser beam was only 1 cm. Stimulated Brillouin scattering in benzene was also observed in this setup. Orig. art. has: 1 figure. [CS]

SUB CODE: 20 SUBM DATE: 15Apr65/ OTH REF: 004/ ATD PRESS: 4168

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L 10242-66 FBD/EWT(1)/EWP(e)/EWT(m)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h) SCTB/IJP(c)

ACC NR: AP6000197 WG/WH SOURCE CODE: UR/0056/65/049/005/1435/1444

55 44 55 44 55 44 55 44

AUTHOR: Aleksandrov, Ye. B.; Bonch-Bruyevich, A. M.; Kostin, N. N.; Khodovoy, V. A.

ORG: none

77

B

TITLE: Investigation of stimulated Raman and Brillouin scattering in selective resonators

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 5, 1965, 1435-1444

21,48,55

TOPIC TAGS: laser, second harmonic nonlinear optics, Raman scattering, Brillouin scattering, resonator

ABSTRACT: The stimulated Raman scattering was investigated at an excitation power just above the threshold using the following three different setups: 1) a Raman cell in the resonator of a laser; 2) a longitudinal selective resonator [the term used by the authors for the case when the Raman laser resonator is in the direction of the ruby laser resonator]; and 3) a transverse selective resonator [the term used for the case when the Raman laser resonator is rotated 90° from the direction of the axis of the ruby laser, i.e., a 90° off-axis Raman laser resonator] (see Fig. 1). In the first setup (Fig. 1a) the giant pulses were produced by a ruby crystal 10 to 12 cm long and 12—16 mm in diameter. With two variable-transmission-coefficient filters (transmission coefficient 10—80% at λ = 6943 Å) the effective intensity of

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2

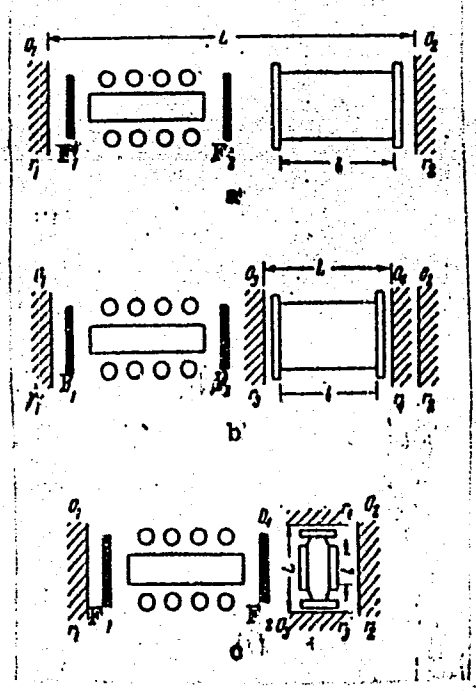


Fig. 1. The experimental setup

a - SRS in the ruby laser resonator; b - SRS in the longitudinal selective resonator; c - SRS in the transverse selective resonator.

L - resonator length for scattered radiation; l - length of the "active" path for the scattered radiation in the resonator; 0 - mirrors; r - coefficient of reflection; F - variable coefficient of absorption filters.

the 20—200 nsec-duration pulses in the resonator reached 100 Mwt/cm^2. The maximum energy per pulse was 5—6 j. Two dielectric mirrors O_1 and O_2 with a transmission coefficient of 0.4% at λ = 694 mμ, 0.8% at λ = 745 mμ (the fundamental SRS line in benzene), and 40% at λ = 805 mμ (the first harmonic) were used in the experiments. The sensitivity of the detectors was sufficient to register 10^{-4} of the energy of the laser pulse. The setup shown in Fig. 1a was used to investigate SRS in benzene. It was observed that an increase in the energy of the pulses from the ruby laser 1.5—2 times above the threshold resulted in a three-order increase in SRS at the fundamental frequency. Saturation was reached when the intensity of SRS was about 10% of the energy input, at which time the second harmonic whose energy output quickly reached the level of SRS at the fundamental frequency (at saturation), appeared. When the second harmonic reached saturation the duration and the intensity of the laser pulses decreased sharply due to the reverse effect of SRS on the ruby laser pulses. When the length of the Raman cell (l) was increased, the threshold power and the pulse energy required to achieve SRS decreased. Also, the larger the cell, the smaller the energy above the threshold at which second harmonics were generated. The SRS was stable when l was between 5 and 60 cm. In the longitudinal selective setup (Fig. 1b) reflector O_2 replaced O_4 and the transmission coefficient of O_3 was very high at λ = 694 mμ and was at a minimum at λ = 745 mμ. The gain of SRS at l = 5, 20, and 60 cm was at least as high as in the previous case, although the pump power and the pulse energy required were considerably smaller. For example, when the output of a ruby laser pulse of 30 nsec duration was 40 Mw (l = 20 cm) three 10 Mw SRS pulses of 20 nsec duration were observed in the Raman laser cell. Similar re-

L 10242-66

ACC NR: AP6000197

sults were obtained using the selective transverse setup shown in Fig. 1c. The authors also observed stimulated Brillouin scattering in benzene, carbon disulfide, and nitrobenzene (the angle of the exciting beam was 90°). Use of the 90° off-axis Raman laser made it possible to obtain stimulated Brillouin scattering at lower pump power. Orig. art. has: 5 figures and 1 table. [CS]

SUB CODE: 20/ SUBM DATE: 15Jun65/ ORIG REF: 003/ OTH REF: 015/ ATD PRESS: 4161

Card 4/4

L 26128-66 EWT(m)/EWP(t) DIAAP/IJP(c) JD

ACC NR: AP6015809 SOURCE CODE: UR/0386/66/003/010/0419/0422

41
39
B

AUTHOR: Aleksandrov, Ye. B.; Sokolov, A. P.

ORG: none

TITLE: Orientation of Cd^{111} nuclei by 3261 Å resonant radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 10, 1966, 419-422

TOPIC TAGS: cadmium, hyperfine structure, resonance line, light excitation, resonance line, line splitting

ABSTRACT: The authors have obtained appreciable orientation of Cd^{111} nuclei in vapor at a density on the order of 10^{14} cm^{-3} with the aid of circularly-polarized 3261-Å light. The method of orientation is similar in its main outlines to that used by the Kastler-Brossel group for odd mercury isotopes (Compt. rend. Acad. Sci. v. 249, 77, 253, 1959). The orientation of the cadmium was realized in a setup (Fig. 1) in which light from a high-frequency cadmium lamp was passed through a circular polarizer to a cuvette with Cd^{111} vapor, saturated at 240C. The transmitted light was passed through a gas filter filled with Cd^{114} vapor, which selectively absorbed the hyperfine component $F = 3/2$ of the 3261 Å resonance line, thus increasing by several times the dependence of the brightness of the transmitted light on the state of orientation of the nuclei. The transmitted light was registered with a photoreceiver. The presence of orientation was established by means of a nuclear resonance signal. To this end, an alternating magnetic field (4.8 kcs) perpendicular to

Card 1/2

ACC NR: AP6015809

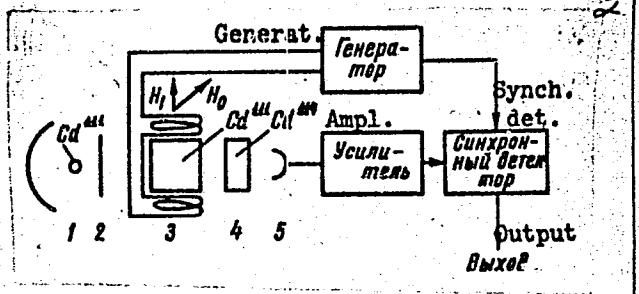


Fig. 1. Diagram of experimental setup. 1 -- Cadmium lamp, 2 -- polarizer, 3 -- cuvette, 4 -- gas filter, 5 -- photoreceiver.

the light ray was applied to the cuvette. The constant field of variable intensity was directed at an angle of 45° to the light-beam axis. With such an arrangement, the magnetic resonance was accompanied by modulation of the transmitted light at the alternating-field frequency, and this served as the resonance signal. A distinct resonance signal with half-width of several cps in a field of 5.2 oe, was observed, approximately corresponding to the published value of the nuclear moment of Cd^{111}. The signal exceeded by two orders of magnitude the noise level, the receiver bandwidth being approximately 1 cps. The authors plan to investigate in the future the character of the relaxation processes in the system and to attain a more complete orientation of the ensemble. The same method can be used to orient Cd^{113}. The authors thank M. P. Chayka for help with the work and A. M. Bonch-Bruyevich for support and interest.

SUB CODE: 20/ SUBM DATE: 11 Mar66/ OTH REF: 005

Card 2/2

L 29967-66 EWT(1) IJP(c)
ACC NR: AP6002883 SOURCE CODE: UR/0286/65/000/024/0041/0041

INVENTOR: Aleksandrov, Ye. B.; Bonch-Bruyevich, A. M.; Khodovoy, V.A.

ORG: none

31
B

TITLE: Method of measuring the modulus and direction of the vector of force of weak magnetic fields. Class 21, No. 176976

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 24, 1965, 41

TOPIC TAGS: magnetic field measurement, vector, weak magnetic field, magnetic field intensity, paramagnetism, measurement

ABSTRACT: The method of measuring the modulus and direction of the vector of force of weak magnetic fields, based on the optic orientation of atoms, is characterized by the fact that the effect of the action of the measured magnetic field and of the known light intensity on the paramagnetic atoms is compared and the magnetic field strength is determined by the intensity of the orienting light. These characteristics are incorporated in order to widen the measurement range of weak magnetic fields.

SUB CODE: 20/ SUBM DATE: 13Apr64

Card 1/1 dc

ACC NR: AP7007681 SOURCE CODE: UR/0386/66/003/002/0085/0088

AUTHOR: Aleksandrov, Ye. B.; Bonch-Bryevich, A. M.; Kostin, N. N.; Khodovoy, V. A.

ORG: State "Order of Lenin" Institute of Optics im. S. I. Vavilov (Gosudarstvennyy ordena Lenina Opticheskiy institut)

TITLE: Frequency shift of optical transition in the field of a light wave

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu, v. 3, no. 2, 1966, 85-88

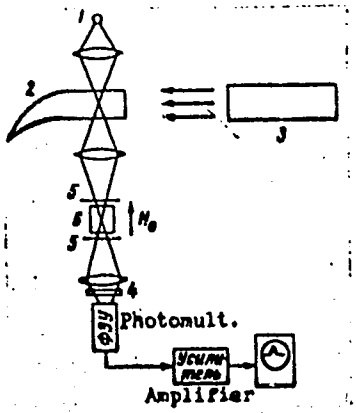
TOPIC TAGS: optic transition, ruby laser, photomultiplier, optic filter, resonance line, laser pulsation, magnetic field intensity, light absorption/FS-7 filter, KS-19 bleaching filter

ABSTRACT: The authors experimentally investigated the frequency shift of the optical resonant transition $4S_{1/2} - 4P_{1/2,3/2}$ of potassium (principal doublet). It can be be shown that the expected frequency shift of this transition is connected principally with virtual transition induced by the laser pulse from the ground level ($4S_{1/2} - 4P_{1/2,3/2}$) and the excited level ($4P_{3/2} - 6S_{1/2}$). The first pair of transitions is still sufficiently far from the resonances (the transition wavelengths are 7665 and 7699 Å, that of the laser is 6943 Å). The $4P_{3/2} - 6S_{1/2}$ transition is much closer to resonance ($\lambda = 6939$ Å). In spite of this, all these transitions make comparable contributions to the sought frequency shift of the investigated transition, owing to the difference in the oscillator strengths. It is important that the ground and

Card 1/4 UDC: none

ACC NR: AP7007681

excited levels are shifted here by the ruby-laser light in opposite directions. In the experiment light from potassium lamp 1 was passed through vessel 2 with potassium vapor saturated at 100°C (see the figure). At the selected temperature, the vapor absorbed about 80% of the lamp's resonant radiation. Transmission of light by vessel 2 was expected to increase during the action of the pulse from laser 3, provided the resultant transition frequency shift is commensurate with the line width of the lamp radiation (it was assumed that this line was broader than the absorption line of the vapor). The transmission of the resonant light was recorded with a photomultiplier whose output was fed to a pulsed oscilloscope (4 - glass filters).



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ACC NR: AP7007681

The scattered laser light in the registration channel was reliably cut out with FS-7 filters. Preliminary experiments have shown, however, that the laser pulse is accompanied by scattered radiation with spectral components lying in the region of the registered potassium line. The authors used a special method of filtering the resonant line with the aid of the Faraday effect to combat the mechanism of radiation occurrence. After passing through vessel 2, the light beam of the potassium lamp was made to pass through an auxiliary cuvette 6 filled with potassium vapor and placed between crossed polaroids 5. A local magnetic field of approximately 2 kOe was applied to cuvette 6. The magnetic field produced, besides splitting of the absorption line, strong radiation of the plane of polarization of the light, but only in the nearest vicinity of optical resonance. By magnetic field intensity selection, the system was made to transmit almost all the resonant line, and to absorb the extraneous light. The entire apparatus behaves like a high-transmission optical filter with a bandwidth on the order of 0.1 cm^{-1}. Under the conditions described, a distinct signal was recorded, evidencing a decrease in the absorption of the resonant light by the potassium atoms in vessel 2 during the time of action of the laser pulse (20 nsec); the laser operated in the monopulse mode by using bleaching filters KS-19. To verify that the change in the light absorption was not connected with some experimental errors the authors checked: (1) that the signal vanished when the potassium light was turned off; (2) that the signal vanished when the potassium vapor was frozen out in vessel 2 (with the illumination on the photomultiplier maintained at the previous level); and (3) that the signal vanished when the operating mode of lamp 1 was forced so as to broaden the emission line (the broadening was confirmed by the observations). The minimum laser radiation power density at which

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ACC NR: AP7007681

the bleaching signal was produced was ~10 MW/cm^2, corresponding to an electric field intensity (in the light) of 10^5 V/cm. The half-width of the spectral emission line is estimated at ~3 x 10^9 cps, so that the observed shift was of the same order. The authors thank D. A. Godina for providing the high grade polaroids. Orig. art. has: 1 formula and 1 figure.

SUB CODE: 20 / SUBM DATE: 30Nov65 / ORIG REF: 001 /
OTH REF: 003

Card 4/4

ALEKSANDROV, Ye.B.; KHODOVOY, V.A.

Letters to the editors. Opt. i spektr. 18 no.6:1090 Je '65.
(MIRA 18:12)

~~ALEKSANDROV, E. B.~~

ALEKSANDROV, Ye. B.

USSR/Engineering - Tool finishing

Card 1/1 : Pub. 103 - 15/23

Authors : Aleksandrov, E. B.

Title : Grinding and finishing of screw thread-cutters

Periodical : Stan. i instr. 8, 33-34, Aug 1954

Abstract : Methods for grinding and finishing screw thread-cutters on a grinding machine, type ZA64, are presented. A silicon-carbide grindstone having abrasive grains of 46 size, was used for this purpose. Drawings.

Institution : ....

Submitted : ....

ALEKSANDROV, Ye.B.

Expanding the ends of steel tubing with hard metal expanders.
Stan. i instr. 26 no.10:35 O'55. (MLRA 9:1)
(Pipe, Steel)

ALEKSANDROV, Ye.B.

AID P - 5359

Subject : USSR/Engineering

Card 1/1 Pub. 103 - 14/25

Author : Aleksandrov, Ye. B.

Title : Device for turning long shafts of small diameter

Periodical : Stan. i instr., 8, 37-38, Ag 1956

Abstract : A description of a device which greatly reduces the time and labor required for turning long, not-rigid, small diameter shafts is given. Four drawings.

Institution : None

Submitted : No date

ALEKSANDROV, Ye. I.

MEASURING INSTRUMENTS

Weaknesses in organizing supervision of measuring tools. Vest. mash. 31 No. 12, 1951

Monthly List of Russian Accessions, Library of Congress, Sept. 1952. Unclassified.

1. ALEKSANDROV, YE. I.

2. USSR (600)

4. Measuring Instruments

7. Shortcomings in organizing the supervisionof measuring equipment. (Remarks on Ye. I. Aleksandrov's article). Vest mash No 9 1952

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

ALEKSANDROV, Ye.K.

Spinal anesthesia in labor. Akush. gin., Moskva No. 1:51-54 Jan-Feb 52.
(CLML 21:4)

1. Candidate Medical Sciences. 2. Of the Obstetric-Gynecological Clinic of Yaroslavl' Medical Institute (Acting Head of Staff--Docent O.G. Aunapu).

ALEKSANDROV,YE. K., CANDIDATE OF THE MEDICAL SCIENCES

Mbr., Department of Obstetrics and Gynecology Yaroslavl Medical Institute

"Methods of open care for the navel using surgical clamps and tannin," Akush. i gin. no.4:60-62 Jl-Ag 1952

ALEKSANDROV, Ye.K.

Concerning M.N. Iur'eva's article on "A new method of treating the umbilical cord.". Akush. i gin. no.6:90-91 N-D '55 (MLRA 9:6)

(UMBILICUS)

ALEKSANDROV, YE. K.

ALEKSANDROV, YE. K. "Material on the study of the pathogenesis, clinical aspects, and treatment of late forms of virus venereal lymphogranuloma (Nicolas-Favre disease) in women (clinical observations in the MNR)." Central Inst for the Advanced Training of Physicians. Moscow, 1956. (Dissertation for the Degree of Doctor in Medical Sciences)

So: Knizhnaya Letopis', No. 18, 1956

ALEKSANDROV, Ye. K.

ALEKSANDROV, Ye.K., dotsent (Yaroslavl')

Surgical treatment of some forms of ulcerative vesidovaginal fistulas and destruction of the urethra. Akush. i gin. 32 no.5: 49-53 S-O '56. (MIRA 10:11)

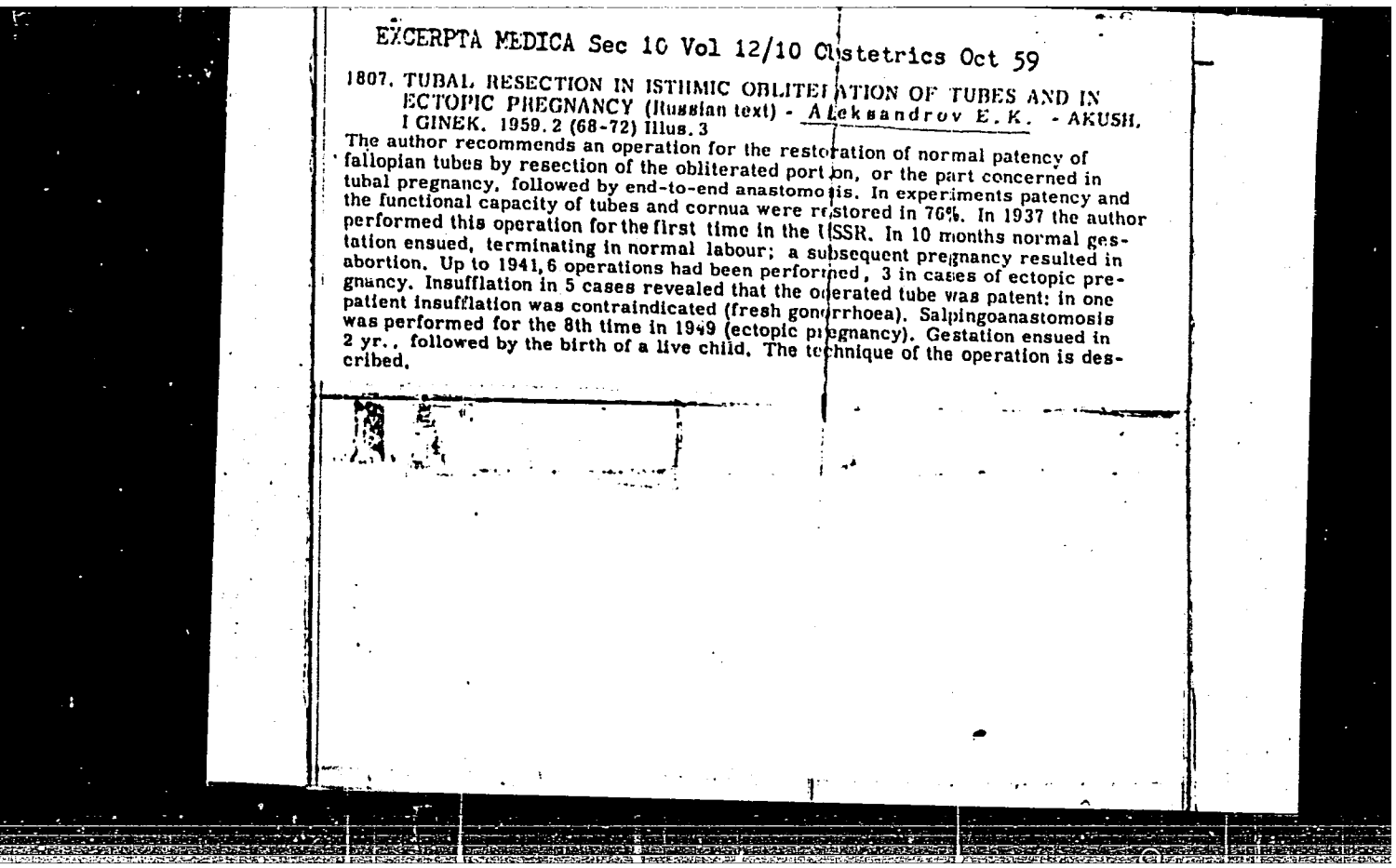
(VAGINA, fistula
vesicovaginal, with destruction of urethra, surg. technic)
(BLADDER, fistula
same)
(URETHRA, dis.
lesions in vesticovaginal fistula, surg. technic)

ALEKSANDROV, Ye.K., doktor med.nauk

Variations in surgery for urogenital fistulas in women [with summary in English]. Akush. i gin. 34 no.1:71-74 Ja-F '58. (MIRA 11:4)

1. Iz kafedry akusherstva i ginekologii (zav. - dotsent Ye.K. Aleksandrov) Yaroslavskogo meditsinskogo instituta.

(UROGENITAL SYSTEM, fistula in women, surg. technics (Rus))



EXCERPTA MEDICA Sec 10 Vol 12/10 Obstetrics Oct 59

1807. TUBAL RESECTION IN ISTHMIC OBLITERATION OF TUBES AND IN ECTOPIC PREGNANCY (Russian text) - Aleksandrov E.K. - AKUSH. I GINEK. 1959. 2 (68-72) Illus. 3

The author recommends an operation for the restoration of normal patency of fallopian tubes by resection of the obliterated portion, or the part concerned in tubal pregnancy, followed by end-to-end anastomosis. In experiments patency and the functional capacity of tubes and cornua were restored in 76%. In 1937 the author performed this operation for the first time in the USSR. In 10 months normal gestation ensued, terminating in normal labour; a subsequent pregnancy resulted in abortion. Up to 1941, 6 operations had been performed, 3 in cases of ectopic pregnancy. Insufflation in 5 cases revealed that the operated tube was patent; in one patient insufflation was contraindicated (fresh gonorrhoea). Salpingoanastomosis was performed for the 8th time in 1949 (ectopic pregnancy). Gestation ensued in 2 yr., followed by the birth of a live child. The technique of the operation is described.

ALEKSANDROV, Ye.K.

Viral lymphogranuloma venerum (Nicolas-Favre disease) as a precancerous disease. Vop.onk. 6 no.2:61-67 F '60. (MIRA 14:2)
(LYMPHOGRANULOMA VENEREUM) (CANCER)

ALEKSANDROV, Ye.K.

Use of peridural anesthesia in gynecology. Akush. i gin. 36 no.4:70-73 Jl-Ag '60. (MIRA 13:12)
(GENITOURINARY ORGANS—SURGERY) (SPINAL ANESTHESIA)

ALEKSANDROV, Ye.K., prof. (Yaroslavl')

Some problems of the prevention and treatment of hemorrhages during pregnancy, labor, and postnatal period. Sbor. nauch. trud. Ivan. gos. med. inst. no. 28:223-231 '63
(MIRA 19:1)

L 34397-66 EWT(d)/T/EWP(1) IJP(c) GG/BB/GD/JXT(BF)
ACC NR: AT6009442 SOURCE CODE: UR/0000/65/000/000/0045/0051

AUTHOR: Aleksandrov, Ye. K.; Sul'povar, V. L.; Timokhin, V. I.

ORG: none

TITLE: The fundamental characteristics of a model learning automaton and certain results of its learning to discriminate patterns

SOURCE: AN SSSR. Nauchnyy sovet po kompleksnoy probleme Kibernetika. Bionika (Bionics). Moscow, Izd-vo Nauka, 1965, 45-51

TOPIC TAGS: logic circuit, logic element, pattern recognition, algorithm, electronic feedback, automaton

ABSTRACT: Logic circuits made up of threshold elements are used as the basis for a learning automaton. These bases were proposed by Varshavskiy in 1962. The problem of pattern recognition is solved by finding the logic function which divides the sets of independent binary variables into two classes. Where Varshavskiy used an ideal logic circuit of threshold elements, in the present work the weight factors of the input of every threshold element in the first layer do not change during teaching and can accept only one of three fixed values +1, 0, -1. With respect to this, the inputs of a threshold element divide into activating ($\xi=+1$), retarding ($\xi=-1$) and blank ($\xi=0$). The thresholds of all the elements are the same and remain constant

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L 34397-66
ACC NR: AT6009442

throughout the entire process. Every threshold element realizes the function $y_i = \text{sign}\left[\sum_{i=1}^{n} \xi_i x_i - \eta\right]$, where ξ_i is the weight factor of the i-th input; x_i is the value of the binary input variable at the i-th input; η is the threshold value; n is the number of the inputs of the automaton and j = 1, 2, 3, ...n. The specific advantages of this automaton are the large volume of information about the signal, the parallel processing principle, and the use of distributed memory. It should be added that there are individual memory units for storing weight factors for each threshold element. The automaton was used in 1962 for discriminating the letters of the Russian alphabet, numbers, and various geometric figures. The methodology for teaching the automaton is discussed. Algorithms were used in the majority of cases. Feedback was discontinued and every element was checked for its correct answer to the teaching sequence. The teaching process was continued for those elements which gave wrong answers. Curves are given showing the increase in the number of correct answers for the elements of the automaton. A part of the experiment consisted of finding out whether the automat was able to recognize new elements of the images already incorporated. This phase of the experiment was called "checking the automaton for generalization." Under these conditions 60 to 80% of the answers were correct. The automaton was simulated on high speed digital computers when the linear law of weight factor change was verified. It is shown that the automaton becomes more flexible with an increase in the number of elements or the complexity of structure. Orig. art. has: 6 figures, 4 formulas.

SUB CODE: 09, 05 / SUBM DATE: 26Oct65 / ORIG REF: 001

Card 2/2 BLG

ALEKSANDROV, Ye.P.

Preparation of models for studying the mechanism of sudden death in insufficiency of coronary circulation. Trudy LSGNI 48:227-238 '59. (MIRA 14:2)

(CORONARY HEART DISEASE) (DEATH (BIOLOGY))

ALEKSANDROV, Ye.V.; FLAVITSKIY, Yu.V.

Determining parameters for electric motors used on cutters and cutter-loaders. Ugol' 32 no.5:24-28 My '57. (MLRA 10:5)
(Electric motors) (Electricity in mining)

ALEKSANDROV, Ye.V., inzh.; NOVAKHOVSKAYA, D.S., inzh.

Using soap stock as a plasticizer. Biul.stroi.tekh. 12 no.10: 15-16 O '55. (MIRA 12:1)

1. Trest "Stroitel'."
(Plasticizers) (Mortar)

ALEKSANDROV, Yevgeniy Vasil'yevich; PATELOVSKAYA, M.I., red.; MOCHALINA, Z.S., tekhn. red.

[Safety manual for roofers] Pamiatka po tekhnike bezopasnosti dlia krovel'shchika. Izd.3., ispr. i dop. Moskva, Gosstroiizdat, 1963. 20 p. (MIRA 17:3)

ALEKSANDROV, Ye.V.; KIRIYA, T.A.; KHMIADASHVILI, P.I.

Vibration compensator for a drilling tool. Neft. khoz. 43 no.5:17-20 My '65. (MIRA 18:6)

ALEKSANDROV, Yu., aviatekhnik

This is how the time is allocated. Grazhd. av. 17 no.8:25 Ag '60.
(MIRA 13:9)

1. Lineyno-ekspuatatsionnaya i remontnaya masterskaya, Leningrad.
(Leningrad--Airplanes--Maintenance and repair)

ALEKSANDROV, Yu.; PILIPUSHKO, I.; VOLCHENKO, V.; SENDEROV, I.; LIMARENKOV, L.; YARKOV, G.; YEMTSEV, I.; KUKHAREV, N.; SHCHEKOTOVICH, P.; BOBOVICH, V.; CHEREPANOV, G.

They are raising the level of their qualifications. Zashch.rast. ot vred.i bol. 7 no.5:61 My '62. (MIRA 15:11)
(Plants, Protection of—Study and teaching)

ZAKHARKIN, O.A.; KOLDAYEVA, T.N.; LISOGURSKIY, Z.I.; SKOVORODKIN, P.A.; POLYAK, M.A.; YUR'YEVA, A.K.; Prinimali uchastiye: GAVSHINOV, I.I.; SAVINA, A.S.; ALEKSANDROV, Yu.A.; SEMENOVA, A.N.

Some peculiarities in preparing rubber mixtures in a two-speed rubber mixer. Kauch. i rez. 20 no.10:39-41 O '61. (MIRA 14:12)

1. Yaroslavskiy shinnyy zavod.
(Rubber industry—Equipment and supplies)

L 24507-65 EWT(m) IJP(c)/SSD/BSD/AFMD(c)/AEDC(a)/SSD(a)/AFWL/ASD(p)-3
AM4020390 BOOK EXPLOITATION ASD(a)-5

Aleksandrov, Yu. A.; Voronov, G. S.; Gerbunkov, V. M.; Delone, N. B.; Nechayev, Yu. I.

Bubble chambers (Puzy*r'kovy*ye kamery*) Moscow, Gosatomizdat, 1963. 339 p. illus., biblio. Errata slip inserted. 3600 copies printed. Under the editorship of: Delone, N. B.; Editor: Matveyeva, A. V.; Technical editor: Popova, S. N.; Proofreader: Smirnov, M. A.

TOPIC TAGS: Bubble chamber, charged particle, track formation, track observation, photofilm scattering, hydrogen refraction, superheated liquid, vapor bubbles, hydrogen chamber

PURPOSE AND COVERAGE: The book represents the first attempt at a systematic exposition of the principles of the operation and the design of bubble chambers and of their possibilities for the observation of particles. Special attention is paid to the physics of the formation and the observation of tracks in the bubble chamber, to generalization of separate data concerning the properties of the working medium, and to chamber design and future trends. V. I. Veksler directed the

Card 1/4

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authors' attention to the need for this compilation. The authors utilized the work of specialists at the Ob"yedinennyy Institut Yadernykh Issledovaniy, the Institut Teoreticheskoy i Eksperimental'noy Fiziki, the Fizicheskiy Institut Akademii Nauk SSSR, and the Moskovskiy Inzhenerno-Fizicheskiy Institut. The authors were aided directly by L. Bernshteyn (computing the scattering of photo-films), V. Morozov (checking the computations of the geometric theory of indica-trices), E. Sviridenkov and A. Suchkov (obtaining data concerning the refractive index of hydrogen), Ye. Zubova (programming and performing the computer work), and G. Panomareva (preparing the illustrations).

TABLE OF CONTENTS:

ALEKSANDROV, Yu.

First aid, for oneself and a comrade. Voen. znan. 42 no.2: 26-27 F '66. (MIRA 19:1)

ACC NR: AP6022040 SOURCE CODE: UR/0120/66/000/003/0221/0222

AUTHOR: Aleksandrov, Yu. A.; Kutsenko, A. V.; Maykov, V. N.; Pavlovskaya, V. V.

ORG: Physics Institute, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: A water soluible epoxial glue for scintillation counters

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 221-222

TOPIC TAGS: glue, epoxy plastic, photomultiplier, cerenkov counter, scintillation counter

ABSTRACT: A water-soluble glue for use in scintillation counters, Cerenkov spectrometers, and other similar equipment has been developed. The glue provides good, uniform optical and mechanical contacts between photoelectric amplifiers and irradiating or light-conducting media. The glue is made from a DEG-1 epoxial resin (a glycerin compound) and a DEG-1 hardener. The glue maintains its consistency 40 to 60 min after it is prepared; it requires approximately 20 hr to fully harden. It takes from several hours to several days to dissolve the glue joints depending on their thickness, the temperature, and rate-of-flow of water, and the surface area of the joint that is exposed to water. The light conducting properties of the glue have been studied on scintillation counters and have been found satisfactory. The authors thank Ye. S. Potekhina, L. A. Skrylova, and Ye. M. Blyakhman for consultations and for supplying the specimens.

SUB CODE: 18,11,09/ SUBM DATE: 14May65/ ORIG REF: 001/ OTH REF: 001

Card 1/1 UDC: 539.1.074.3

ALEKSANDROV, Yu.A., inzhener.

Controlling the operation of transformers in urban electric networks. Energetik 2 no.2:19-20 F '54. (MLRA 7:4)
(Electric transformers)

ALEKSANDROV, Yu.

Gigantic radiotelescopes. Nauka i zhizn' 22 no.10:54 O '55.(MLRA 9:1)
(Telescope, Radio)

ALEKSANDROV, Yu

SHREYBER, V.; ALEKSANDROV, Yu.

Urgent problems concerning operation of transformers in city electric power networks. Zhil.-kom.khoz. 6 no.8:14-15 '56. (MLRA 10:2)

1. Glavnyy inshener tresta "Kavminenergo" (for Shreyber)
2. Nachal'nik tekhnicheskogo otdela tresta "Kavminenergo" (for Aleksandrov).

(Electric transformers)

ALEKSANDROV, Yu.A., inzhener; SHREYBER, V.P., inzhener.

Operating 6 kv city power lines in sleet areas. Energetik 5 no.6:17-19 Je '57. (MLRA 10:7)

(Electric lines)

ALEKSANDROV, Yu., inzhener; SHREYBER, V., inzhener.

Some problems in operating city cable lines. Zhil.-kom. khoz. 7 no.2:11-13 '57. (MLRA 10:4)
(Electric cables)

Aleksandrov, Yu. A.

94-1-13/24

AUTHORS: Shreyber, V.P. and Aleksandrov, Yu.A.

TITLE: Extravagance in the Construction of Urban Electricity Distribution Systems (O nekotorykh izlishestvakh v stroitel'stve gorodskikh elektricheskikh setey)

PERIODICAL: Promyshlennaya Energetika, 1958, No.1, pp. 27 - 29 (USSR)

ABSTRACT: There are as yet no general rules about the design of urban distribution systems. Therefore, the erection of lines for distribution of electricity, radio and communications, street lighting and supply to electric clocks is not co-ordinated. Much expenditure can be saved by preparing rules for the combined erection of such lines and siting them to fit in with street gardens. It is wasteful to use columns only for street lighting. An example of the multiple use of lighting poles is shown in Fig.1.
Since it is now necessary to provide concrete footings for wooden poles, the spacing of poles should be reviewed to avoid waste. Greater use should be made of reinforced concrete in various structures. At present the common types of transformer mounting and distribution equipment use little reinforced concrete. Existing typical transformer-stations for general supply are somewhat extravagant and greater use should be made

Card1/2

ALEKSANDROV, Yuriy Andreyevich; STREL'NIKOV, Aleksandr Alekseyevich; SHREYBER, Viktor Petrovich; ALTUF'YEVA, A.M., red.izd-va; LELYUKHIN, A.A., tekhn.red.

[Experience in the operation of electric networks in the cities of Stavropol Territory] Iz opyta ekspluatatsii elektricheskikh setei gorodov Stavropol'skogo kraia. Moskva, Izd-vo M-va kommun. khoz.RSFSR, 1959. 77 p. (MIRA 12:10)
(Stavropol Territory--Electric networks)

ALEKSANDROV, Yu.S.

Use of cable cabinets in 6 - 10 kv. power distribution networks. Trudy LIEI no.41:183-189 '62. (MIRA 17:6)

1. Trest "Kavminvodokvar".

L 23129-66 EWT(1)/EWA(h)
ACC NR: AP6001572 (A) SOURCE CODE: UR/0120/65/000/006/0084/0089

AUTHOR: Aleksandrov, Yu. A.; Kutsenko, A. V.; Maykov, V. N.; Pavlovskaya, V. V.; Solov'yev, S. G.

ORG: Institute of Physics, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Using an AI-100 pulse analyzer as a storage device

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1965, 84-89

TOPIC TAGS: pulse analyzer, computer storage device/ AI-100 pulse analyzer

ABSTRACT: The remodeling of an AI-100 pulse analyzer for purposes of measuring two simultaneous pulses is described; a fifth program ("storage operation") is introduced into the AI-100. The storage is controlled from the outside, while the arithmetic unit is used for receiving and recording two simultaneous pulse trains. The resulting storage device has a constant dead time at its two inputs of 120 μsec, a pulse-height range of 1—100 v, and 99 storage addresses for synchronously recording the results of measuring two pulses. Tables of operations and commands are given. Such a remodeled analyzer has been used for one year in conjunction with two Cerenkov total-absorption spectrometers (with the 680-Mev FIAN synchrotron). Orig. art. has: 1 figure and 2 tables.

SUB CODE: 09 / SUBM DATE: 23Nov64 / ORIG REF: 002

Card 1/1

UDC: 621.374.3

L 28055-66 EWT(1)/ETC(m)-6 IJP(c) WW

ACC NR: AP5027006 SOURCE CODE: UR/0120/65/000/005/0045/0048

AUTHOR: Aleksandrov, Yu. A.; Kutsenko, A. V.; Maykov, V. N.; Pavlovskaya, V. V.

ORG: Institute of Physics of AN SSSR, Moscow (Fizicheskiy institut)

TITLE: Time characteristics of Cerenkov total-absorption spectrometer

SOURCE: Pribory i tekhnika eksperimenta, no. 5, 1965, 45-48

TOPIC TAGS: gamma spectroscopy, Cerenkov radiation, Cerenkov counter, photomultiplier tube

ABSTRACT: In order to investigate the resolving time of a Cerenkov spectrometer, a method of coincidence circuits was applied. A spectrometer (described in PTE 1964, no. 34, p. 38) with a 300-mm radiator was used. The light from the radiator was collected by the FEU-49 photomultiplier tube. The coincidence circuit was formed by the addition of two FEU-36 photomultipliers which had an adequate amplification factor and a time spread not greater than 2 nsec. By such an arrangement a resolving time of about 4 x 10^{-9} sec was obtained without diminishing the 100-pct efficiency of recording the gamma quanta in the range from 100 to 600 Mev. After a preliminary theoretical study, the experiments

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UDC: 539.1.074.4

were conducted and the performance of the coincidence circuit was tested. The experimental curves showed that at the electron energy of 100 Mev, a 100-pct efficiency of recording was attained when two additional FEU-36 photomultipliers were included in the circuit. The dependence of the recording efficiency upon the resolving time was also investigated and the curves of "delayed" coincidences were plotted for electron beam energies of 100 and 500 Mev. In the case of 100 Mev, the best resolving time was 4.7×10^{-9} sec while at 500 Mev the 100-pct efficiency was attained at about 4×10^{-9} sec. The comparison of these results with the data published by other authors showed the superiority of the above arrangement. The authors expressed their appreciation to Ye. M. Leykin for the discussion of various problems, to T. I. Kovaleva for the selection of FEU-36 tubes and the assistance in measurements, and to the personnel operating the 680-Mev synchrotron. Orig. art. has: 3 graphs, 1 table and 1 formula.

SUB CODE: 18 / SUBM DATE: 21Aug64 / ORIG REF: 003 / OTH REF: 003

ACC NR: AP7001938 SOURCE CODE: UR/0120/66/000/012/0050/0054

AUTHOR: Aleksandrov, Yu. A.; Kutsenko, A. V.; Maykov, V. N.; Pavlovskaya, V. V.

ORG: Physics Institute, AN SSSR, Moscow (Fizicheskiy institut AN SSSR, Moskva)

TITLE: A system of correlated Cherenkov spectrometers with analysis of data on an M-20 computer

SOURCE: Pribory i tekhnika eksperimenta, no. 6, 1966, 50-54

TOPIC TAGS: nuclear radiation spectrometer, spectrometer, Cerenkov counter, computer application

ABSTRACT: A system designed to measure correlated γ-quanta or electrons in the 100—600-Mev range is described. The system, originally designed to study neutral particles generated by a 680 Mev synchrotron, consists of two full-absorption Cherenkov spectrometers working either in a coincidence or an anticoincidence mode, recording and storage logic circuits, and calculating and output equipment. The recording and storage logic circuits consist of an AI-100 analyzer with a changeable program, linear amplifiers, and transistorized and tunnel-diode logic circuitry. Control and calculation is performed by an M-20 computer.

Card 1/2 UDC: 539.1.074.04

ACC NR: AP7001938

Input to the computer is on 80-column punched cards. The output equipment comprises a card punch (the output card punch of the M-20 computer), an EUM-23 electric typewriter, and a number of calculating devices of the PS-100 system. The system output is a 100 x 100 x,y printed matrix. Information along the x and the y axes indicates the pulse amplitude registered by the first and second spectrometers. Some of the system parameters are: energy resolutions, ± 21.5—9.5%; resolving time of the two spectrometers connected for coincidence, 5 nsec; dead time when registering occurrences, 130 nsec; capacity of the operating intermediate memory, 99 addresses with 16 bits in each; readout time from the intermediate memory, 10 sec (on a punched card); system process time for 10,000 numbers (including input and output time), 10 min. Orig. art. has: 1 figure

SUB CODE: 18/ SUBM DATE: 17Nov65/ ORIG REF: 007/ OTH REF: 002

Card 2/2

30206

S/081/61/000/019/032/085
B110/B138

53700

AUTHORS: Aleksandrov, Yu. A., Brilkina, T. G., Shushunov, V. A.

TITLE: Oxidation of organometallic compounds. 3. Synthesis and some properties of triethyl lead oxide

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1961, 145, abstract 19Zh44 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 3, 1960, 381-387)

TEXT: The oxide of triethyl lead (I) was obtained by reaction of disperse metallic Na with triethyl lead monohydroxide (II) in benzene. I decomposes at ~ 20°C, reacts vigorously with acetone and acetaldehyde, and reacts instantaneously with water to form II quantitatively. When reacting with methyl, ethyl, benzyl, and α,α-dimethyl-benzyl alcohols, as well as with hydroperoxides of tert-butyl and α-cumyl, I gives the corresponding oxy and peroxy derivatives of triethyl lead, which are unstable at ~20°C. The rate of thermal decomposition of I at 70-90°C without solvent was studied. The products obtained consist of an equimolar mixture of C_2H_6 and C_2H_4 (with an impurity of 1-1.5 % of butane), 0.97 mole of

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Oxidation of organometallic...

triethyl lead per mole of used I, and a solid substance containing 87.1 % of Pb, which is insoluble in organic solvents. The authors assume that the accelerating effect of I on the oxidation of hexaethyl dilead by O_2 in n-nonane solution is caused by the ability of I to decompose with the formation of ethyl radicals, whereby a degenerate chain reaction is effected. For Report 2 see RZC, 1961, 8Zh231. [Abstracter's note: Complete translation.]

Card 2/2

30207

S/081/61/000/019/033/085
B110/B138

5.3700

AUTHORS: Aleksandrov, Yu. A., Radbil', B. A., Shushunov, V. A.

TITLE: Oxidation of organometallic compounds. 4. Oxidation of hexaethyl ditin with oxygen

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1961, 145, abstract 19Zh45 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 3, 1960, 388-393)

TEXT: The oxidation of hexaethyl ditin (I) with oxygen (II) in n-nonane solution at concentrations of I ranging from 10 to 100 mole% has been studied. The oxidation rate of I is described by a first-order equation according to the concentration of I, and is independent of the pressure of II within the range of 300-500 mm Hg. In the temperature range of 60-90°C, E(act.) is 19.5 kcal/mole. 0.55 mole of diethyl stannic oxide, 0.62 mole of triethyl stannic oxide, and 0.12 mole of acetaldehyde are formed per mole of oxidized I. Water was found qualitatively. The oxidation of I is not catalyzed by addition of 13.2 mole% of triethyl lead oxide. Addition of 2,6-di-tert-butyl-4-methyl phenol lowers the

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Oxidation of organometallic...

reaction rate to approximately one-tenth, which is indicative of a chain mechanism of the reaction. [Abstracter's note: Complete translation.]

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5 3700

31961
S/081/61/000/023/017/061
B117/B147

AUTHOR: Aleksandrov, Yu. A.

TITLE: Production of triethyl-tin peroxide

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1961, 230, abstract 23Zh240 (Tr. po khimii i khim. tekhnol. (Gor'kiy), no. 3, 1960, 642 - 643)

TEXT: A solution of equimolar quantities of anhydrous H_2O_2 and $[(C_2H_5)_3Sn]_2O$ (I) in ether is shaken with anhydrous Na_2SO_4 at ~20°C for 15 minutes, and decanted. Ether is distilled off in vacuo, and the residue diluted with hexane (II). (II) is distilled from the filtrate at -10°C and $[(C_2H_5)_3Sn]_2O_2$ is obtained. The peroxide decomposes completely at ~0°C within 24 hr; at 60°C it explodes, with water it decomposes more slowly than (I). [Abstracter's note: Complete translation.]

Card 1/1

5.3400

77907
SOV/79-30-2-58/78

AUTHORS: Shushunov, V. A., Aleksandrov, Yu. A.

TITLE: Concerning the Decomposition of the Benzoyloxy Radicals in Solutions

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 2, pp 632-634 (USSR)

ABSTRACT: Benzoyl peroxide on heating dissociates into benzoyloxy radicals which, in turn, decompose into phenyl radicals and CO_2.

$$(C_6H_5COO)_2 \rightleftarrows 2C_6H_5COO\cdot \quad (1)$$
$$C_6H_5COO\cdot \rightleftarrows C_6H_5\cdot + CO_2 \quad (2)$$

If the above reactions are reversible then, in the presence of tagged CO_2, the tracer atoms should pass into the nondecomposed benzoyl peroxide and also into the benzoic acid formed in reaction of the benzoyloxy radicals with the solvent.

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Concerning the Decomposition of the Benzoyloxy Radicals in Solutions

77907
SOV/79-30-2-58/78

$$C_6H_5COO\cdot + HR \longrightarrow C_6H_5COOH + R\cdot \qquad (3)$$

In the present study, benzoyl peroxide was decomposed by heating to 70-80° C in the presence of $C^{14}O_2$ in various solvents (carbon tetrachloride, benzene, mixtures of various alcohols with benzene, etc.). It was established that reaction (2) was irreversible and that, under the conditions of the experiment, there was no exchange of C atoms between CO_2 and the benzoyloxy radicals. There are 2 tables; and 5 references, 3 U.S., 2 Soviet. The 3 U.S. references are: L. Jaffe, E. Prosen, M. Szwarc, J. Chem. Phys., 27, 416 (1957); N. Zwiebel, J. Turkevich, W. Miller, J. Am. Chem. Soc., 71, 376 (1949); A. Seidell, Solubilities of Inorganic and Metallorganic Compounds, Vol 1, N.Y. (1953).

ASSOCIATION: Gor'kiy Scientific Research Institute of Chemistry (Gor'kovskiy nauchno-issledovatel'skiy institut khimii)

SUBMITTED: February 12, 1959

Card 2/2

ALEKSANDROV, Yu. A., Cand. Chem. Sci. (diss) "Liquid-Phase Oxidation of Hexa-ethyl-diolov, Hexa-ethul-dis-lead and Tetra-ethyl-lead by Oxygen." Moscow, 1961, 16 pp (Acad of Sci. USSR) Instit. of Elementary Organic Compounds) 150 copies (KL Supp 12-61, 255)

S/081/61/000/024/011/086
B138/B102

5 3700

AUTHORS: Aleksandrov, Yu. A., Brilkina, T. G., Shushunov, V. A.

TITLE: Oxygen oxidation of distannic ethide, diplumbic ethide and tetraethyl lead

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 24, 1961, 75, abstract 24B541 (Tr. po khimii i khim. tekhnol., [Gor'kiy], no. 1, 1961, 3 - 11)

TEXT: The oxidation of distannic ethide (I), diplumbic ethide (II) and tetraethyl lead (III) by oxygen was studied in solutions of n-C_9H_{20} and $C_6H_3Cl_3$ at 50 - 90°C. Additions of triethyl-tin peroxide cause considerable acceleration of oxidation of I, although the initial increase is not sustained, the reaction rate returning to normal in the course of time. The products of oxidation of I are tin diethyl oxide, tin triethyl oxide, CH_3CHO and H_2O. Activation energy of the process is 19.5 kcal/mol. In oxidation of II lead oxide, III, C_2H_5OH, CH_3CHO, and H_2O are formed.

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Oxygen oxidation of distannic...

S/081/61/000/024/011/086
B138/B102

The dependence of oxidation rate of II on temperature and initial concentration is of a critical nature. Considerable variations in the rate of the process are observed with very slight (60 to 62.5°C for instance) variations in these parameters. Additions of lead triethyloxide accelerate oxidation of II, and additions of H_2O retard it. C_2H_6, C_2H_4, C_4H_{10}, CH_3CHO, H_2O, the 1-hydro-2-oxide of triethyl lead, the 2-hydro-2-oxide of diethyl lead, and the mono- and dioxide of lead are formed in oxidation of III. Addition of solid oxidation products considerably accelerates oxidation of III. [Abstracter's note: Complete translation.]

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42947

S/081/62/000/022/026/088
B144/B101

11.2140

AUTHORS: Aleksandrov, Yu. A., Shushunov, V. A.

TITLE: Organometallic peroxide compounds. 2. Synthesis and some properties of triethyl tin peroxide

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1962, 227, abstract 22Zh240 (Tr. po khimii i khim. tekhnol. [Gor'kiy], no. 3, 1961, 644-651)

TEXT: $(C_2H_5)_3SnOOSn(C_2H_5)_3$ (II) was synthesized by reacting $(C_2H_5)_3SnOSn(C_2H_5)_3$ (I) with anhydrous H_2O_2. A solution of 2-3 g I and 1 equ. H_2O_2 in 15 ml ether was agitated for 10-15 min (20°C) with 1-1.5 g anhydrous Na_2SO_4 (III); the solvent was evaporated and 10-15 ml of hexane were added in the presence of 1-1.5 g III. Within 5-8 min (of agitation) II was separated after the solvent had been evaporated from the filtrate. In the synthesis a contact between reaction mixture and air moisture was avoided. II hydrolizes readily to give $(C_2H_5)_3SnOH$ and H_2O_2

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Organometallic peroxide compounds. ...

(yield in H_2O_2 100.2%). On heating (60°C) II explodes. In n-nonane (0.11-0.66 M) II decomposes according to a first-order reaction (E(act) 14 kcal/mole) with formation of $(C_2H_5)_3SnOC_2H_5$ and $(C_2H_5)_2SnO$ in equivalent amounts. If II reacts with a solution of $(C_2H_5)_3SnSn(C_2H_5)_3$ (IV) in n-nonane (20°C) then I arises. The peroxide II decomposes when induced and is capable of initiating oxidation and polymerization reactions. The course of thermal decomposition of II and its reactions with IV are discussed. Communication 1 see RZhKhim, 1961, 23Zh240.
[Abstracter's note: Complete translation.]

Card 2/2

88569

S/020/61/136/001/017/037
B016/B055

5 3700

AUTHORS: Aleksandrov, Yu. A., Brilkina, T. G., and Shushunov, V. A.

TITLE: Bistriethyl-lead Oxide

PERIODICAL: Doklady Akademii nauk SSSR, 1961, Vol. 136, No. 1, pp. 89-92

TEXT: Bistriethyl-lead oxide, $((C_2H_5)_3Pb)_2O$, was synthesized with a view to establishing its properties and studying it in detail. In an earlier work the authors had found that bistriethyl-lead oxide has a marked accelerating effect on the oxidation of hexaethyl dilead by oxygen. They assume this effect to be due to free radicals formed by decomposition of bistriethyl-lead oxide. Basing on their own results, they state that this compound has never actually been obtained by other researchers (Refs. 2-4), since bistriethyl-lead oxide hydrolizes in alcoholic and aqueous solutions. The authors therefore applied a different method: They dispersed metallic sodium in n-nonane, removing the n-nonane thereafter by decanting and distilling off, and then poured on dry benzene. To this mixture they added a triethyl lead monohydroxide portion so calculated that sodium was well

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Bistriethyl-lead Oxide

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in excess. In the course of 2-3 h triethyl lead monohydroxide was transformed into bistriethyl-lead oxide which is readily soluble in benzene. After filtering off the solid residue, and distilling off the benzene, bistriethyl-lead oxide was obtained as mobile, faintly yellowish-green liquid with a sharp specific smell. At room temperature, bistriethyl-lead oxide hydrolizes to triethyl lead monohydroxide (to an extent of 98-99%). Alcohols and tertiary alkyl- and aryl hydroperoxides act similarly to water, transforming the bistriethyl-lead oxide to oxy- or peroxy compounds of triethyl lead, besides triethyl lead monohydroxide. At temperatures of only -10°C, several of these reactions occur at an appreciable rate. The authors studied the effect of methyl-, ethyl- and benzyl alcohol, dimethyl-phenyl carbinol, tert-butyl- and α-isopropyl phenyl hydroperoxide on bistriethyl-lead oxide. The following compounds were obtained: ethoxy triethyl lead, terto-butoxy triethyl lead, α-isopropyl-phenyl peroxy triethyl lead, methoxy triethyl lead and α-isopropyl-phenoxy triethyl lead. The organic oxy- and peroxy compounds of lead are unstable and decompose gradually at room temperature in sealed ampoules, accompanied by a color-change to redbrown. Bistriethyl-lead oxide reacts vigorously with acetone at room temperature, under formation of triethyl lead monohydroxide. In

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Bistriethyl-lead Oxide

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the presence of a great excess of acetone, mesityl oxide and a resin which was not further investigated were formed. On heating, bistriethyl-lead oxide decomposes comparatively rapidly with liberation of an equimolecular mixture of ethane and ethylene, and 1% butane. The residue is tetraethyl lead (Ref. 7). There are 2 figures, 1 table, and 7 references: 2 Soviet, 2 German, 2 US, and 1 British.

ASSOCIATION: Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom gosudarstvennom universitete im. N. I. Lobachevskogo (Scientific Research Institute of Chemistry of the Gor'kiy State University imeni N. I. Lobachevskiy)

PRESENTED: July 4, 1960, by M. I. Kabachnik, Academician

SUBMITTED: July 4, 1960

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28732
S/020/61/140/003/013/020
B103/B101

5.3700

AUTHORS: Aleksandrov, Yu. A., and Shushunov, V. A.

TITLE: Triethyl tin peroxide

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 3, 1961, 595-597

TEXT: Since peroxides of the type R_nMOOMR_n (R = hydrocarbon radical, M = metal) are only known for Cd, Si, and Ge, the authors investigated the triethyl tin peroxide (TETP) synthesized by them, $(C_2H_5)_3SnOOSn(C_2H_5)_3$. The synthesis was carried out by mixing equimolar amounts of triethyl tin oxide and anhydrous H_2O_2, dissolved in absolute ethyl ether, in the presence of anhydrous sodium sulfate. After 10 - 15 min vigorous shaking, the mixture was filtered, and a new portion of sodium sulfate was added to the filtrate. After distilling off the ether at reduced pressure and room temperature, a small amount of hexane was added, and shaken for another 2 - 3 minutes. After filtering off the sodium sulfate, hexane was distilled off. The residue was a viscous, golden-yellow liquid, pure TETP (100-101 % active oxygen). Its synthesis was achieved according to the reaction:

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Triethyl tin peroxide

$$(C_2H_5)_3SnOSn(C_2H_5)_3 + H_2O_2 \rightleftharpoons (C_2H_5)_3SnOOSn(C_2H_5)_3 + H_2O \quad (1).$$

The resulting water was bound by sodium sulfate. The tin content was 53.6 %, the molecular weight 443.4. TETP is very easily hydrolyzed by water without heating: $(C_2H_5)_3SnOOSn(C_2H_5)_3 + 2H_2O \rightarrow 2(C_2H_5)_3SnOH + H_2O_2$ (2)

This reaction was used to determine the active oxygen by means of permanganatometric titration. TETP is very unstable and decomposes completely within 24 hr at approximately 0°C. At 60°C, decomposition proceeds most vigorously in a sealed glass phial; an explosion occurs after 2-3min. In n-nonane solution, this reaction is much slower. It can be described by a kinetic reaction equation of first order. During the reaction, a white deposit is precipitated from the solution. It is unsoluble in ordinary organic solvents and was identified as diethyl tin oxide. A second product of thermal decomposition, ethoxy triethyl tin (boiling point 190-195°C), remained in the solution. It can be hydrolyzed with water, thus forming triethyl tin monohydroxide. From 1 mole of TETP, 0.93 moles of diethyl tin oxide, and 0.98 moles of ethoxy triethyl tin are formed. The apparent activation energy of TETP decomposition in n-nonane is 14 kcal. Polymerization of methyl methacrylate and acrylonitrile is

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Triethyl tin peroxide

initiated by additions of TETP. At room temperature, TETP reacts very fast with hexaethyldi-tin, giving triethyl tin oxide as a result of the reactions:

$$(C_2H_5)_3SnO + (C_2H_5)_3SnSn(C_2H_5)_3 \rightarrow (C_2H_5)_3SnOSn(C_2H_5)_3 + (C_2H_5)_3Sn \quad (7)$$

$$(C_2H_5)_3Sn + (C_2H_5)_3SnOOSn(C_2H_5)_3 \rightarrow (C_2H_5)_3SnOSn(C_2H_5)_3 + (C_2H_5)_3SnO \quad (8)$$

$$(C_2H_5)_3SnO + (C_2H_5)_3Sn \rightarrow (C_2H_5)_3SnOSn(C_2H_5)_3 \quad (9)$$

$$2(C_2H_5)_3Sn \rightarrow (C_2H_5)_3SnSn(C_2H_5)_3 \quad (10)$$

During the reaction of hexaethyl di-tin with oxygen, TETP may be formed as an intermediate which, could not be proved because of the high reaction rate. However, oxidation is accelerated by additions of TETP. The methods of these experiments were described before (V. A. Shushunov et al., Tr. po khim. i. khim. tekhnol., Gor'kiy, 1959, p. 329; Yu. A. Aleksandrov et al., ibid., 1960, p. 381). The oxidation of hexaethyl di-tin is accelerated either by TETP, or by the radicals formed during its transformation, but not by diethyl- and triethyl tin oxides which are formed during this process. The reaction of TETP with hexaethyl di-tin is accompanied by a formation of radicals which initiate oxidation of hexaethyl di-tin by oxygen. There are 3 figures and 3 Soviet references.

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S/020/61/140/003/013/020
B103/B101

Triethyl tin peroxide

ASSOCIATION: Gor'kovskiy gosudarstvennyy universitet im. N. I. Lobachevskogo (Gor'kiy State University imeni N. I. Lobachevskiy)

PRESENTED: February 25, 1961, by B. A. Arbuzov, Academician

SUBMITTED: February 22, 1961

Card 4/4