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Magneto-Optical Resonance in Ferromagnetics. 1.The Visible Region

affected within the limits of experimental error on reversal of magnetization. When circularly polarized light was used at an angle of incidence of 70^0 the change in the reflected light intensity was 6×10^{-4}. When the sense of rotation of circularly polarized light was reversed, the magneto-optical effect was found to change its sign, in agreement with the phenomenological theoretical formulae.
There are 1 figure, 1 table and 7 references, 2 of which are Soviet, 3 English and 2 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 14, 1957

Card 6/6

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2"

"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

AUTHORS: Krinchik, G. S. and Stroganova, I. S.

TITLE: Magneto-optical Properties of Iron, Nickel and Cobalt in the Ultraviolet Range (Magnitoopticheskiye svoystva zheleza, nikelya i kobal'ta v ul'trafioletovoy oblasti)

PERIODICAL: Fizika metallov i metallovedeniye, Vol 7, Nr 3, pp 460-461 (USSR)

ABSTRACT: Magneto-optical measurements were carried out in the ultraviolet portion of the spectrum in order to widen the frequency range in which the dynamic properties of ferromagnets are investigated. The effect of change in intensity of reflected light on re-magnetizing the specimen was measured in the visible as well as in the infrared region by Krinchik (Ref.1) and Krinchik et alia (Ref.2). The equipment was laid out according to the plan given by Krinchik (Ref.1), but instead of the photo-resister FSK-1, the photo-intensifier FEU-18 and the photoelectric cell STsV-4, were included. The spectrograph ISP-22 provided with a mercury quartz lamp PRK-4 served as a monochromator. Nickel and cobalt specimens were polished mechanically and fixed between the terminals of small

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Magneto-optical Properties of Iron, Nickel and Cobalt in the Ultraviolet Range.

electro-magnets. In measurements using Armco iron part of the magnetic circuit surface was polished and served as a specimen. The authors obtained graphs for the dependence of the effect on the current in magnetizing coils for Fe, Co and Ni in the visible light region. Results obtained in the magnetic saturation region for a few intensive mercury lines are given in the table on p 460. Values of M_1 and M_2 have been calculated by formulae obtained by Krinchik (Ref.1), and the optical constants are taken from Minor (Ref.3). There is 1 table, and 5 references of which 2 are Soviet, 2 English and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 26, 1958

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

AUTHORS: Krinchik, G.S., and Nuraliyeva, R.D. SOV/126-7-5-10/25

TITLE: Magneto-Optical Resonance in Ferromagnetics. II. The Near Infrared Region (Magnitoopticheskiy rezonans v ferromagnetikakh. II. Blizhnyaya infrakrasnaya oblast')

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 5, pp 694-698 (USSR)

ABSTRACT: Change of intensity of light reflected from nickel, cobalt and iron samples on reversal of magnetization was measured at various angles of incidence in the wavelength region 0.9-8 μ. Measurements were made in the same way and at the same magnetizing currents as in Part I (Ref 1). The apparatus used is shown schematically in Fig 1. Light from a source S passed through a monochromator M, was polarized by a selenium mirror P, and, after reflection from a sample Q, was focused by a mirror N onto one of the junctions ("a") of a vacuum thermoelement. Some of the light from the source S was directed by a system of mirrors towards N in such a way as to focus it on the second junction ("b") of the thermoelement. The intensity of light reaching the junction "b" was increased until the signal reaching the input of an amplifier became zero. When magnetization of the sample Q was

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reversed the amplifier recorded a reading proportional to the change of the intensity of light reflected from the ferromagnetic sample. One half of this deflection was divided by the intensity of reflected light and a quantity δ was obtained in this way. Experimental curves of δ as a function of wavelength obtained at various angles of incidence are shown for nickel, cobalt and iron in Figs 2, 3 and 4 respectively. From values of δ for two angles of incidence (45 and 85° for nickel, 45 and 80° for cobalt and iron) the real and imaginary components (M_1 and M_2) of the magneto-optical constant were obtained using Eq (5) of Part I (Ref 1). The dependences of M_1 and M_2 on wavelength are shown in Fig 5. Continuation of these curves into the visible region are shown as dashed curves (the data were taken from part I). The values of M_1 and M_2 of iron and cobalt could not be calculated for wavelengths greater than 2.25 μ because of the lack of published data on the optical constants in that region. The curves of Fig 5 confirm the existence of a new type of resonance in the near infrared region (this resonance in the visible

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Magneto-Optical Resonance in Ferromagnetics. II. The Near Infrared Region SOV/126-7-5-10/25

region is described in Part I). The authors discuss a possible explanation of the resonance as a spin magnetic resonance in an effective exchange field.

Card 3/3 There are 5 figures and 11 references, of which 5 are Soviet, 4 English and 2 translations from English into Russian.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: May 14, 1957

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

24(3)
AUTHORS: Krinchik, G. S., Nuraliyeva, R. D.

SOV/56-36-4-9/70

TITLE: Magnetooptical Resonance in Nickel at Infrared Frequencies (Magnitoopticheskiy rezonans v nikele na infrakrasnykh chastotakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1022-1024 (USSR)

ABSTRACT: In the present paper the authors report about investigations of the resonance absorption of infrared light in nickel by means of a magnetooptical method. The experimental arrangement consisted essentially of a 40.40.3 mm mechanically polished plate made from electrolyte nickel, which was fitted between the poles of an electromagnet. The sample was magnetized vertical to the plane of incidence of the light up to saturation. The light was polarized in its plane of incidence; the light reflected by the sample fell on one of the junctions of the vacuum thermocouple, and part of the light of the same source was directed by means of a system of mirrors to the other compensation junction of the element. By means of this arrangement the intensity variation of the light reflected by the sample was measured when the sample was remagnetized. For current recording the galvanometer M 21/4 was used, which was

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connected to the photoelectrooptical multiplier FEOU-15. A scheme showing the experimental order is given by reference 2. The following is assumed to hold for $\hat{\varepsilon}$:

$$[\varepsilon] = \begin{pmatrix} \varepsilon & -i\varepsilon M & 0 \\ i\varepsilon M & \varepsilon & 0 \\ 0 & 0 & \varepsilon \end{pmatrix}$$

where M is the magnetooptical parameter, a material constant. It further holds that $M = M_1 + M_2$, and with $\delta = \Delta I/I$ it holds that $\delta = 2 \sin 2\varphi(M_1 A - M_2 B)/(A^2 + B^2)$; φ is the angle of incidence, A and B are functions of n, k and φ. Figure 1 shows the measuring results of the variation of δ for nickel at different angles of incidence of light. Every point on the curve is the result of mean value calculation obtained from 40 readings. Within the investigated range of 4 - 8μ it could be observed that at $\sim 4\mu$ the effect changes its sign; the curves have a minimum at negative δ-values and a maximum in the range of positive values. δ is inversely proportional to n^2 and k^2, n and k grow rapidly with increasing wave length (see table). The diagram contains the curves for φ = 60, 75, 80 and 85°. Figure 2

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Magnetooptical Resonance in Nickel at Infrared Frequencies

shows the λ-dependence of M_1 and M_2 at $\varphi = 75$ and 85°. M_2 increases with λ up to about 4μ, after which it again decreases; M_1 is in the negative and has a minimum at 4μ. This resonance wave length of $\lambda = 4 \pm 0.5\mu$ corresponds to the reorientation energy of the spin magnetic moment of the electron in the exchange field of the ferromagnetic. There are 2 figures, 1 table, and 8 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: October 9, 1958

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

24 (3)

AUTHORS: Krinchik, G. S., Chetkin, M. V. SOV/56-36-6-42/66

TITLE: On the Problem of Determining the Tensors of the Dielectric Constant and of the Magnetic Permeability of a Medium (K voprosu ob opredelenii tenzorov dielektricheskoy i magnitnoy pronitsayemosti sredy)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 6, pp 1924 - 1925 (USSR)

ABSTRACT: For the purpose of investigating gyrotropic media at optical or radiofrequencies it is of importance to know the connection between the gyrotropicity of the medium and ε and μ. The latter is investigated in the present "Letter to the Editor". First, the components of ε and μ, which are different from zero, are written down, after which the equation for the determination of the refraction index, and the latter as a function of ε, μ, ε_0 and μ_0 are written down. In the following the light refraction in the case of transversal magnetization is investigated, and equations for the reflection coefficients and the intensity variation of the light reflected from a gyrotropic medium are written down. From the formulas obtained the conclusions

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On the Problem of Determining the Tensors of the Dielectric Constant and of the Magnetic Permeability of a Medium

SOV/56-36-6-42/66

are, among others, drawn that metallic ferromagnetics at optical frequencies and ferrites at excessively high frequencies may have gyromagnetic properties, that the Hall effect must lead to gyroelectricity of the medium, and that ferrites and metallic ferromagnetics having a high Hall effect are bigyrotropic. There are 6 references, 5 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: December 29, 1958

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

S/058/61/000/012/056/083
A058/A101

AUTHOR: Krinchik, G. S.

TITLE: New magnetooptical method for studying domain structure in ferromagnetics

PERIODICAL: Referativnyy zhurnal, Fizika, no. 12, 1961, 384, abstract 12E686 (V sb. "Magnitn. struktura ferromagnetikov". Novosibirsk, Sib. otd. AN SSSR, 1960, 51 - 52)

TEXT: There is proposed a method for observing domain structure by means of the meridional or equatorial Kerr effect at limit optical magnifications. This method can also be used for measuring the magnetic characteristics of ferromagnetics on surface sections within a few square microns or even fractions of a micron. The essence of the method consists in the fact that in reflecting microscopes at high magnifications the majority of light rays are incident on the specimen at non-zero angles, i.e. neither the meridional nor the equatorial Kerr effect is equal to zero. Experiments were carried out showing the feasibility of the proposed method. With the aid of the МИМ-7 (MIM-7) and ФЭУ (FEU) microscopes the equatorial Kerr effect was measured on a 3 x 5 μ section of a siliceous Fe specimen.

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A058/A101

AUTHOR: Krinchik, G.S.

TITLE: Domain-boundary structure and dynamic properties of ferromagnetics

PERIODICAL: Referativnyy zhurnal. Fizika, no. 12, 1961, 384, abstract 12E692 (V sb. "Magnitn. struktura ferromagnetikov", Novosibirsk, Sib. otd. AN SSSR, 1960, 85 - 89)

TEXT: Domain-boundary shifts in the presence of potential barriers were calculated. Microscopic eddy currents account for the appearance of additional braking of domain boundaries. In this way one can explain the peculiar kind of viscosity incident to displacement of individual domain boundaries, a viscosity which does not depend on specimen thickness and which is proportional to the electric conductivity of the specimen. When an AC field acts on ferromagnetics, the indicated additional braking leads to the appearance of Arkad'yev viscosity bands. Experiment indicates that the natural frequencies of these bands are inversely proportional to specimen thickness, the initial permeability and the electric conductivity of the substance. Application of the present theory to the

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case of magnetic viscosity in aperiodic fields also enables one to explain a number of experimental regularities from a unified point of view.

O. K. ✓

[Abstracter's note: Complete translation]

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S/194/61/000/008/079/092
D201/D304

AUTHORS: Krinchik, G.S. and Chetkin, M.V.

TITLE: Gyromagnetic and gyroelectric properties of ferrites

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 8, 1961, 53, abstract 8 I343 (V sb. Ferrity. Fiz. i fiz.-khim. svoystva, Minsk, AN BSSR, 1960, 578-586)

TEXT: The propagation is considered of plane electromagnetic waves in a medium with gyroelectric and gyromagnetic properties. A method is given for determining the character of the medium gyrotropicity. The measurements carried out have shown that the magneto-optical properties of ferrites in the visual range are determined by the ϵ tensor properties. Determination of the μ tensor of ferrite in the sub-millimeter and visual ranges may be carried out by measurements with reflected light. 6 references.

[Abstracter's note: Complete translation]

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24.3600 (1035, 1106, 1114)

83931
S/188/60/000/004/006/014
B005/B060

AUTHORS: Krinchik, G. S., Nuraliyeva, R. D.

TITLE: Magnetooptical Properties of Iron - Nickel and Nickel - Copper Alloys in the Infrared Region

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, 1960, No. 4, pp. 45-46

TEXT: The authors of the present paper studied the magneto-optical properties of ferromagnetic binary alloys of iron - nickel and nickel - copper at wavelengths of light in the range from 1 to 8μ. The alloys were prepared at the NIIChermet (Scientific Research Institute of Ferrous Metallurgy). The measurements were made with a previously described method (Ref. 1). Two diagrams illustrate the results obtained. On the ordinates there are plotted the values of δ (relative change in intensity of linearly polarized light under equatorial magnetization of the sample) (Ref. 1), while the wavelengths of infrared light are plotted on the abscissas. The first diagram shows the results obtained

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Magnetooptical Properties of Iron - Nickel and Nickel - Copper Alloys in the Infrared Region

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B005/B060

for technical nickel, purer (electrolytical) nickel, and for two nickel - copper alloys with 10% and 20% copper content. The other diagram shows results for pure iron, pure nickel, and five iron - nickel alloys (90%, 70%, 64%, 21.5%, and 10% iron content). Two typical changes may be observed on the curves at the point of transition from pure metal to the alloy: 1) the resonance in the longwave range, which appears in pure nickel, either vanishes entirely on the addition of copper or iron, or it is shifted to the far infrared; 2) the addition of relatively small amounts of copper or iron causes a reduction in the value of δ. For nickel - copper alloys, these two effects are based on the decrease of the spontaneous magnetization I_s (δ is approximately proportional to I_s^2), while for nickel - iron alloys the value of δ decreases a great deal also when I_s remains practically constant, or even rises. This behavior is probably due to a change, caused by the addition of the other component, in the periodicity of the lattice potential of the pure initial metal. This explanation presupposes a participation of conduction electrons in the magnetooptical effects, and therefore approaches

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Magnetooptical Properties of Iron - Nickel and Nickel - Copper Alloys in the Infrared Region

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B005/B060

the theory of magneto-optics in ferromagnetic systems as formulated by S. V. Vonsovskiy and A. V. Sokolov (Ref. 3). The influence of a change of electrical resistivity also explains the great difference found in the values of δ in the farther infrared range for two nickel samples having different degrees of purity (Fig. 1). Another possible explanation follows from the theory by Hulme-Argyres (Ref. 4), in which the appearance of magneto-optical effects is explained by band-to-band transitions of electrons. In this case, the decrease in δ values would be the result of a decrease in the constant of the spin-orbital interaction, or of a deformation of the energy bands of the alloys. The authors are at present conducting measurements on other alloys and, in addition, the temperature dependence of magneto-optical effects is being examined. There are 2 figures and 4 references:-3 Soviet and 1 British.

ASSOCIATION: Moskovskiy universitet Kafedra magnetizma (Moscow University, Chair of Magnetism)

SUBMITTED: January 11, 1960

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AUTHOR: Krinchik, G. S.

TITLE: A Method of Measuring the Magnetic Properties of a Thin Surface Layer of a Ferromagnetic Material

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 8, pp. 1945 - 1948

TEXT: The present paper describes a method of measuring the magnetic properties of a surface layer that is less than 1 μ thick. This method is based on the use of the magneto-optical equatorial Kerr effect. The advantages that the equatorial effect has over the polar effect for these purposes are described in detail. The equatorial effect is a change in the intensity of reflected light. This change is directly proportional to the magnetization of the surface layer of the ferromagnetic material. The polar effect, however, can only be used to measure saturation magnetization. The equatorial effect enables one to record the magnetization curve and the hysteresis loop, and to measure the remanent magnetization and the coercive force. The surface layer which is equal to the

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A Method of Measuring the Magnetic Properties of a Thin Surface Layer of a Ferromagnetic Material

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B006/B063

depth of penetration of light into the ferromagnetic material, has a thickness of 0.03 μ for visible light. The meridional Kerr effect offers the same possibilities as the equatorial effect, but the rotation of the polarization plane requires an analyzer which causes losses in light intensity. The magnetic properties of such layers may thus be determined from the equatorial Kerr effect by measuring the differences in the intensity of the reflected light with the highest accuracy possible. The maximum changes of intensity in saturation magnetization vary from 0.5% (Fe) to 0.1% (Ni). The values for cobalt and most alloys are found between these values. The measuring arrangement used by the author is described in the paper of Ref. 3. The photoresistor was replaced by a selenium photocell. The results obtained are illustrated in Figs. 1 and 2. These diagrams show the magnetization curves and the hysteresis loops of electrolytic nickel and a permalloy-type Ni-Fe alloy (70 Ni.30 Fe), measured by the magneto-optical and ordinary ballistic methods. A few other possibilities for applications of this method are finally discussed. There are 2 figures and 3 references: 2 Soviet and 1 German.

~~Card 2/3~~ Moscow State Univ, Dept of Physics, Chair of Magnetism

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B006/B063

AUTHORS: Krinchik, G. S., Chetkin, M. V.

TITLE: The Faraday Effect in Yttrium Garnet at Infrared Frequencies

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 5, pp. 1643 - 1644

TEXT: The authors measured the rotation of the polarization plane during the passage of light of a given wavelength, $\lambda = 1\ \mu$, through a magnetized ferrite in the visible and in the near infrared. In these regions, the Faraday effect was found to be related to electron transitions as well as the light absorption by the ferrite. The experiments were made with $Y_3Fe_5O_{12}$ in the λ-range 0.94 - 9 μ. The authors used the modification of a previously described experimental arrangement. Polarized light passed through the sample and the analyzer which was turned by 45° relative to the polarizer. The sample itself was a single crystal 75 μ thick. Variations in the intensity of the penetrating light

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The Faraday Effect in Yttrium Garnet at Infrared Frequencies

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within a 3500-oe field were directly measured, and the rotation of the polarization plane was calculated in degrees/cm. A diagram shows the Faraday effect in the infrared as dependent on wavelength. Near the band edge of electronic absorption at $\lambda \sim 1$ μ, the rotation of the polarization plane decreases rapidly. Within the range of maximum transmissivity and at the beginning of phononic light absorption, the rotation is almost constant. The rotation of the polarization plane may be 1) due to electron transitions or 2) due to free electron motion. In the first case, the angle of rotation is proportional to λ^{-2}, while in the second case, it is proportional to λ^{2}. The effects observed can be described in part only by the first possibility. The change in the intensity of the penetrating light, observed at $\lambda \sim 1$ μ with a magnetic reversal by about 30%, might be of practical importance in the construction of a controlled gyrator or light modulator. The authors thank Professor A. G. Smolenskiy for making available the single crystals of yttrium garnet. There are 1 figure and 4 references: 1 Soviet, 1 French, 1 German, and 1 US.

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S/126/61/011/002/003/025
E032/E514

AUTHORS: Krinchik, G. S. and Gorbachev, A. A.

TITLE: Magnetooptic Resonance in Nickel on Ultraviolet Frequencies

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.2, pp. 203-206

TEXT: In a previous paper the present author and R. D. Nuraliyeva (ZhETF, 1959, 36, 1022) pointed out that the magnetooptic resonance due to electronic s-d transitions is to be expected in the ultraviolet region of the spectrum. In the present paper an experimental study of this effect is reported. The apparatus used to measure the magnetooptic characteristics of nickel and iron below 2480 Å was similar to that described by the first of the present authors in Ref.4. The detecting element was a ФЭУ-18 (FEU-18) photomultiplier, while the compensating element was the vacuum photocell СЦВ-4 (STsV-4). The spectrograph ИСП-22 (ISP-22) was used in conjunction with the mercury quartz lamp ПРК-4 (PRK-4) as the monochromator. The principal difficulty was to screen the photomultiplier from the electromagnetic

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field, since it was necessary to measure very small changes in the intensity of the reflected light during the magnetization reversal in ferromagnetic specimens. In order to reduce the magnetic flux leakage, the specimens were in the form of toroids (internal diameter 20 mm, external diameter 30 mm). A part of the surface of these toroids, having an area of about 1 cm^2, was kept free of the magnetizing coil and the light was reflected from it. The specimens were polished and annealed in vacuum prior to insertion of the magnetizing coils. Magnetic saturation could be obtained using 1000 turns and a current of 0.5 A. Fig.2 gives the real and imaginary parts of the magnetooptic parameter calculated by Nuraliyeva, using the optical constants for nickel as given by R. S. Minor and W. Meyer in Ref.5. Fig.3 gives the relative change in the real and imaginary parts of the non-diagonal term of the dielectric constant tensor, i.e. $m_1 = Re(\varepsilon M)/\varepsilon_1$ and $m_2 = Im(\varepsilon M)/\varepsilon_2$. where $\varepsilon = \varepsilon_1 - i\varepsilon_2$ is the diagonal term and $M = M_1 - iM_2$ is the complex magnetooptic parameter. In both figures the energy (in eV) is plotted along the horizontal axis. The physical meaning of m_1 and m_2 is as follows. When $M < 1$,

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$\mu \ll 1$ we have $\varepsilon_{\pm} = \varepsilon \pm \varepsilon M$, where ε_+ and ε_- are the dielectric constants for right and left-handed circularly polarized waves (G. S. Krinchik and M. V. Chetkin, Ref.6). It follows that m_1 describes the difference in the real parts of the dielectric constant of a saturated ferromagnetic for right and left handed polarizations, while m_2 describes the difference in the imaginary parts, i.e. the energy loss. In the case of ferromagnetic, cyclotron, plasma resonances, the quantities analogous to m_1 and m_2 exhibit the following behaviour: m_1 changes sign at the resonance frequency, while m_2 in general passes through a maximum. Hence in the present case the resonance frequency is determined as the frequency at which m_1 changes sign and this occurs at 4.7 ± 0.2 eV. This result is in agreement with X-ray data and also data on characteristic electron energy losses. It is suggested that the resonance is due either to s-d transitions or to plasma oscillations of free electrons. Measurements were also made on iron specimens but the magnetooptic resonance was not established. There are 2 tables, 3 figures and 7 references: 4 Soviet and 3 non-Soviet.

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KRINCHIK, G.S.; CHETKIN, M.V.

Infrared electronic transition in the Er^{3+} ion. Opt. i spektr. 11 no.2:274-275 Ag '61. (MIRA 14:8)
(Infrared rays)
(Erbium--Spectra)

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24,3600 (1106, 1114, 1137)

S/056/61/040/003/003/031
B102/B202

AUTHORS: Krinchik, G.S., Chetkin, M.V.

TITLE: The magneto-optical properties of garnet-type ferrites in the range of infrared

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 3, 1961, 729 - 733

TEXT: The magnetic properties of infrared-transmissive garnet-type ferrites are determined by their three sublattices: By Fe^{3+} ions at tetrahedral sites (d), by Fe^{3+} ions at octahedral sites (a), and by the rare-earth elements or yttrium (c). Since the magnetic moment of the sublattice c is opposite to that of the iron ions, these ferrites at a certain temperature show a compensation point at which the spontaneous magnetization vanishes (the magnetic moment of c is equal to that of (a+d)). In their investigations, the authors chose one garnet-type ferrite without a compensation point, viz. $Y_3Fe_5O_{12}$ (a report on studies about the Faraday effect of this ferrite in the infrared range has been given by the authors

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The magneto-optical properties of ...

in an earlier paper: ZhETF, 38, 1643, 1960), and one with a compensation point (at 136°K), viz. $Ho_3Fe_5O_{12}$. The latter shows about the same, considerable saturation magnetization at room temperature and at the temperature of liquid nitrogen. The Faraday effect was measured at these two temperatures. The specimens were prepared in the form of polished single-crystal plates, about 100μ thick, and with 0.1 cm^2 wide faces. An МКС-11 (IKS-11) spectrograph served as a monochromator in the measuring instrument. Infrared light polarized by a selenium reflector penetrated the crystal which was polarized perpendicularly to its surface (H = 1500 oersted) and fell upon the analyzer which consisted in several silver chloride plates inclined under 45° to the polarizer. A Nernst needle and a glow lamp served as light sources, a vacuum thermocell and an ФЭУ-22 (FEU-22) photomultiplier as receivers. The results of the measurements are shown in Figs. 2 (holmium garnet) and 3 (yttrium garnet). The specific rotation α of the plane of polarization is plotted on the ordinate in deg/cm. Holmium garnet shows a clear anomaly at $\lambda = 2\mu$, which, as was shown by absorption measurements, is related to the band absorption at $\lambda = 1.96\mu$. This absorption band is most likely to be connected with an electron tran-

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B102/B202

The magneto-optical properties of ...

sition between the first two levels of the multiplet term $^5I_8 \rightarrow {}^5I_7$. Yttrium garnet shows a weak absorption at $\lambda \sim 0.92\mu$ related to an electron transition in the Fe^{3+} ions. The authors show that it is possible to study separately the effects of the various sublattices of the ferrimagnetic upon the rotation of the plane of polarization by comparing the data for holmium and yttrium-garnet ferrites. Fig. 4 illustrates the infrared transmittance of the two examined garnets. Finally, the authors thank V.A. Timofeyeva and K.P. Belov for having grown the crystals. There are 4 figures and 6 references: 3 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: September 5, 1960

Card 3/3

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28748
S/056/61/041/003/001/020
B125/B102

24.3600 (1035, 1147, 1385)

AUTHORS: Krinchik, G. S., Chetkin, M. V.

TITLE: Exchange interaction and magneto-optical effects in garnet ferrites

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 673 - 680

TEXT: Besides the Faraday effect caused by electron transitions, the infrared spectral range exhibits a Faraday effect which is related to the magnetic spin resonance. The equation found by L. D. Landau and Ye. M. Lifshits (Sow. Phys., 8, 153, 1955) permits studying the motion of the spin-system of a ferromagnetic. The authors experimentally studied the Faraday effect in garnets of yttrium, holmium and erbium at wave lengths from 3.5 to 8μ, using a method they had published before. (ZhETF, 38, 1643, 1960, ZhETF, 40, 729, 1961; Optika i spektroskopiya, 11, 274, 1961). The measurements with yttrium garnet at liquid-hydrogen temperatures were brought to a greater quantitative accuracy. The results of these measure-

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ments are compiled and compared with theory in Fig. 1 and in the Table. The theoretical values for all the garnets were calculated for the dielectric constant $\epsilon = 4.84$. The reflexion coefficient of light with $\lambda = 0.6\mu$ and $\lambda = 1.0\mu$ at the natural faces of the yttrium and erbium-garnet single crystals is $n = 2.2 \pm 0.2$. $4\pi I_s \approx 2.300$ oersteds at liquid-nitrogen temperature. The Faraday effect does increase, fails, however, to reach the calculated values which correspond to magnetic saturation of the specimen. Some measurements made at 2800 oersteds, proved to agree satisfactorily with the numerical values of the Faraday rotation $\tilde{\alpha}_\xi$ of the plane of polarization. The experimental values of $\tilde{\alpha}_\xi$ for erbium and holmium garnets fit into the theory only when an exchange resonance is assumed to exist in these garnets. The change in sign of $\tilde{\alpha}_\xi$ as the result of cooling the holmium garnet to liquid-nitrogen temperature is another proof of the exchange resonance of rare-earth garnets. Comparison of experimental and calculated results shows that in a certain interval of wave lengths the rotation of the plane of polarization of light in the ferromagnetic depends on the dynamic magnetic susceptibility of the ferromagnetic in the alternating magnetic field of the light wave. A Faraday effect of some ten

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degrees per centimeter was measured. That is, of the same order of magnitude as the shf Faraday effect in ferrites. In visible light the Faraday effect caused by electron transitions under the action of the electric vector of the light is predominant. The change of the Faraday effect in the infrared range, permits determining the amount, the anisotropy and the temperature dependence of the g-factor of the rare-earth ions contained in the ferrite garnets. A spectrograph of the type ИКС -11 (IKS-11) with an LiF prism and with an 0.2-mm slit was used to determine the Zeeman effect in the exchange field of a ferrimagnetic. The results are shown in Fig.2. The authors found a Zeeman triplet with a splitting which corresponds to a magnetic field of some 10^5 oersteds. The experimental results were completely identical with the rough theoretical estimates. It is possible that the magnetic properties of the ferromagnetics depend also in other cases on the mechanism of the splitting due to exchange. Perhaps it is also possible to control the occurrence of polarized absorption lines of a solid by a weak external magnetic field. G. A. Smolenskiy is thanked for having supplied the europium-garnet monocrystals. There are 3 figures, 1 table, and 10 references: 6 Soviet and 4 non-Soviet.

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S/056/62/042/006/003/047
B104/B102

AUTHORS: Krinchik, G. S., Nuraliyeva, R. D.

TITLE: Magnetooptic resonance in ordered alloys and the inner-crystalline field of a ferromagnetic metal

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 6, 1962, 1442 - 1450

TEXT: The equatorial Kerr effect and the relative variation of the intensity of a reflected line of polarized light (p-component) during magnetization of ordered and disordered Ni_3Fe, Ni_3Mn, FeCo and Fe_3Al alloys were measured. The aim was to make clear the role of band splitting caused by the innercrystalline field in magnetooptics of ferromagnetic metals and to estimate the splitting of the 3d-band in the crystal field of some ferromagnetic metals and alloys. The magnetooptic resonance of ferromagnetic metals in the visible and in the near infrared region is explained by electron transitions between Stark levels of d-electrons in the inner-crystalline field of the metal. The shape of the resonance curves and their positions are determined by the nature of the nearest neighbors of

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Magnetooptic resonance in...

the transition atoms in the lattice. The band splitting due to the crystal field is estimated to be 1 ev. This is a proof of the model with a split 3d-band. The magnitude of the innercrystalline field, the degree of d-electron localization and the magnetic properties of ferromagnetic alloys and metals are discussed. There are 4 figures and 1 table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: January 10, 1962

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINCHIK, G. S., TYUTNEVA, G. K., Moscow State University - "Some results of magneto-optical investigations of rare earth iron garnets" [Invited paper] Session L; KRINCHIK, G. S. - "Ferromagnetic hall effect at optical frequencies and inner effective magnetic field of ferromagnetic metals" Session O

SMOLENSKIY, Georgiy Anatol'yevich, Institute of Semiconductors, Academy of Sciences USSR - "On the coexistence of electric and magnetic ordering in crystals" [Invited paper] Session P

Report to be presented at -

ELECTRICAL AND ELECTRONIC ENGINEERS, INSTITUTE OF (AIEE) - Ninth Annual Conference on Magnetism and Magnetic Materials - Atlantic City, New Jersey, 10-13 Nov 63

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KRINCHIK, G.S.

Magnetooptics of rare earth ions in ferromagnetic crystals.
Fiz. tver. tela 5 no.2:373-380 F '63. (MIRA 16:5)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.
(Magnetooptics)
(Rare earths--Spectra)

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACCESSION NR: AP4023393 S/0048/64/028/003/0481/0488

AUTHOR: Krinchik, G.S.

TITLE: Magneto-optics of ferromagnetic metals [Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May - 5 June 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.28, no.3, 1964, 481-488

TOPIC TAGS: magneto-optics, magneto-optical parameter, dielectric constant, reflection, refraction ferromagnet, cobalt, iron, nickel, optical constants of ferromagnets

ABSTRACT: Despite the fact that there have been many theoretical and experimental investigations of magneto-optical effects in ferromagnetic metals, the true physical nature of these effects is still obscure. In the present paper there is presented an analysis of the experimental data obtained in measuring the magneto-optical characteristics of iron, nickel and cobalt in the ultraviolet, visible and infrared regions (G.S.Krinchik and others, Izv.AN SSSR,Ser.fiz.21,1293,1957; Fizika metallov i metalloved.7,181,1959; Ibid.,7,694,1959; 7,460,1959; 11,204,1961; Zhur. eksp.i teor.fiz.36,1022,1959; Ibid.,42,16,1962). In these experiments there was

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ACCESSION NR: AP4023393

measured the equatorial Kerr effect for two angles of incidence, on the basis of which one can calculate any magneto-optical characteristic when the optical constants are known. Formulas are given for the complex magneto-optical parameter M and the values of M_1 and M_2 for Fe, Ni and Co are presented in graphic form. As part of the analysis, to substantiate the theoretical approach there are compared (in figures) the experimental and theoretical values of $\epsilon_1' = \epsilon_1 M_1 - \epsilon_2 M_2$ and $\epsilon_2' = \epsilon_1 M_2 - \epsilon_2 M_1$ versus $h\nu$. Also compared are the experimental and theoretical values of R. The role played by different internal fields in ferromagnets is discussed. Orig.art.has: 11 formulas, 6 figures and 1 table.

ASSOCIATION: Fizicheskiy fakultet Moskovskogo gosudarstvennogo universiteta (Physics Department, Moscow State University)

SUBMITTED: 00 DATE ACQ: 10Apr64

SUB CODE: PH NR SOV REF: 006 ENCL: 00

OTHER: 004

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

[redacted], G. S.

"Measurement of the gyro-magnetic constant (gyrotropic mu tensor) in an iron/cobalt/nickel alloy."

report presented at Intl Conf of Magnetism, Nottingham, UK, 6-13 Sep 64.

Moscow State Univ.

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KRINCHIK, G.S.

Magnetoptics of ferromagnetic metals. Izv. AN SSSR.Ser.fiz. 28 no. 3:481-488 Mr '64. (MIRA 17:5)

1. Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta.

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ACCESSION NR: AP4044690

AUTHOR: Krinchik, G. S.; Nurmukhamedov, G. M.; Zolotarev, V. P.

TITLE: System for measuring the magnetic characteristics of ferromagnetics on surface areas of approx. $1u^2$

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1964, 171-175

TOPIC TAGS: ferromagnetic, ferromagnetic characteristic measurement, thin film characteristic

ABSTRACT: The described magneto-optical system for measuring the magnetic characteristics of ferromagnetics is based on [illegible] signal measurement which, as [illegible], increases the sensitivity of the system and sharply re[illegible] measure-ment time. The system makes it possible [illegible] curve of massive ferromagnetics and their magnetic [illegible] areas of approx. 1u. Furthermore, it makes possible [illegible] of the hysteresis loop and the coercive [illegible]. The described magneto-optical system exceeds at least [illegible] orders of magnitude that of other precision systems [illegible] existence. Orig.

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L 17[illegible]-65

ACCESSION NR: AP4044690

art. has: 6 figures and 3 formulas.

ASSOCIATION: Fizicheskiy fakul'tet MGU (Division of Physics, MGU)

SUBMITTED: 03Aug63 ENCL: 00

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

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACCESSION NR: AP4023394 S/0048/64/028/003/0489/0494

AUTHOR: Krinchik, G. S.; Tyutneva, G. K.

TITLE: Investigation of exchange and ferromagnetic resonances in ferrite-garnets by the magneto-optical method [Report, Symposium on Ferromagnetism and Ferroelectricity held in Leningrad 30 May - 5 June 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 3, 1964, 489-494

TOPIC TAGS: absorption, infrared absorption, electron transition, magneto-optics, ferromagnetic resonance, exchange resonance, magneto-absorption, Zeeman effect, Faraday effect, europium ferrite-garnet, dysprosium ferrite-garnet, terbium ferrite-garnet, ferrite-garnet

ABSTRACT: An earlier study (G. S. Krinchuk and M. V. Chetkin, Zhur. eksp. i teor. fiz. 41, 673, 1961) found that the 2.04 μ $^7F_0$—$^7F_6$ absorption line of Eu^{3+} in europium ferrite-garnet has a relatively simple structure because of the zero total angular momentum in the

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ground state. The present paper describes the results of similar investigation of the absorption in the 3.25-μ region, which is identified with the $^7F_0 — ^7F_6$ transition in the Eu^{3+} ion. An IKS-12 spectrograph was employed with an LiF prism, which made it possible to realize a resultion of about 10 cm^{-1} (instead of the 40 cm^{-1} of the earlier study). The fact that the $^7F_0 — ^7F_4$ line is considerabley more intense than the $^7F_0 — ^7F_6$ line also favors bringing out fine structure. The specimens were 100-μ polished europium ferrite-garnet plates, cut parallel to the crystal axes with an accuracy to 7°. The light source was a globar. The light was modulated by a mechanical shutter at a frequency of 200 cps. The detector was a liquid nitrogen cooled PbS photoresistor coupled to an amplifier and recorder. The specimens were magnetized in a 2000-Oe field. The measurements were carried out with circularly polarized light in the case of longitudinal magnetization and plane polarized light in the case of transverse magnetization. The absorption curves for the different cases are reproduced in figures. The curves indicate that the transition in question is neither pure electric dipole nor pure magnetic dipole, for in no case is there observed the corresponding typical Zeeman splitting.

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ACCESSION NR: AP4023394

Analysis of the curves also indicates that the relative contribution of electric and magnetic dipole transitions varies, depending on the orientation of the magnetization vector relative to the crystal axes. In view of the separation between the line components it is inferred that the subsidiary lines evinced in the absorption curves are associated with excitation of collective vibrations of the spin system under the influence of the infrared radiation; the significance of this inference is explored. The first paper mentioned hypothesized that the frequency independent Faraday effect in the region above 4 μ is of purely ferromagnetic origin. To check this further, the present work measured the temperature dependence of the Faraday effect at 4.5 μ in 100-μ thick plates cut from dysprosium and terbium ferrite-garnets. These measurements were performed with the aid of an IKS-12 spectrograph with an NaCl prism. The polarizer was a germanium mirror and the analyzer a stack of AgCl plates. The Faraday effect was measured from room temperature down to about liquid nitrogen temperature (100°K). The results are presented in the form of curves and interpreted as substantiation of the above-mentioned hypothesis: the change in sign (slope) of the curves corresponds to a compensation point in the

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ACCESSION NR: AP4023394

respective materials. Finally, the present work measured the Faraday effect at the $^7F_0 - ^7F_4$ (3.25 μ) line by a procedure analogous to that employed in the earlier work for the $^7F_0 - ^7F_6$ (2 μ) line. The experimental results are given in the form of a curve, characterized by a resonance-like dip, and compared with the results of theoretical calculation of the wavelength dependence of the Faraday effect. A reasonably good fit is obtained by taking into account four components (two for each circular polarization), whereas in the case of the $^7F_0 - ^7F_6$ transition only two lines had to be taken into account. Orig. art. has; 2 formulas and 6 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 10Apr64 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 001

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APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2"

"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACCESSION NR: AP4019203 S/0056/64/046/002/0435/0443

AUTHORS: Krinchik, G. S.; Tyutneva, G. K.

TITLE: Magnetooptics of Eu+++ ions in a ferromagnetic crystal

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 435-443

TOPIC TAGS: europium iron garnet, europium ferrite garnet, magneto-optics, infrared, infrared absorption line, absorption line fine structure, fine structure anisotropy, spin wave excitation, spin wave combined excitation, ferromagnetic crystal, ferromagnetic crystal spin system, Faraday effect

ABSTRACT: The effects of an external magnetic field on the optical properties of europium iron garnet (EIG) in the infrared were investigated using an IKS-12 spectrograph with an LiF prism in light mechanically interrupted at 200 cps. The sample was magnetized in a 2000-Oe field. Anisotropy is observed in the fine structure of

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the $^7F_0 \rightarrow {}^7F_4$ absorption line, probably caused by the increased role of magnetic dipole transitions in this line. Some fine-structure components obtained with circularly polarized light can be interpreted as combination excitation of spin waves by optical transitions in the rare-earth ions of the ferromagnetic crystal. It is shown that this effect can be used to investigate the natural frequencies of the magnetic spin system of a ferromagnetic crystal. Agreement between the experimental study of the Faraday effect in EIG and the theory has shown that the Faraday effect has an exchange origin in the region of the $^7F_0 \rightarrow {}^7F_4$ absorption line employed, since the fine structure of this line is due to the level splitting of the Eu^{3+} ions in the exchange field of the iron sublattices of the garnet. The exchange effect was also verified by measurements of the temperature dependence of this line. The authors state that the results are not conclusive because of the small differences between many of the characteristic energies of the EIG, but they demonstrate some ad-

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ACCESSION NR: AP4019203

vantages of the magnetooptic method. "The EIG single crystals were grown by A. G. Titova, to whom we are grateful." Orig. art. has: 9 figures and 4 formulas.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova AN SSSR (Mathematics Institute AN SSSR)

SUBMITTED: 28Jun63 DATE ACQ: 27Mar64 ENCL: 00

SUB CODE: PH NO REF SOV: 002 OTHER: 003

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACCESSION NR: AP4043661 S/0056/64/047/002/0[illegible]

AUTHOR: Krinchik, G. S.; Nurmukhamedov, G. M.

TITLE: Magnetization of a ferromagnetic metal by the magnetic field of a light wave

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 778-780

TOPIC TAGS: ferromagnetics, ferromagnetic resonance, magnetooptical effect, magnetooptics, Kerr effect, gyromagnetic effect

ABSTRACT: The magnetic permeability of light-irradiated ferromagnetic iron has been determined by direct measurements of the gyromagnetic Kerr effect, using a specially constructed indicator of reflected light variations. The measurements showed that the values of the gyromagnetic effect were approximately 100 times higher than those of the gyroelectric effect; their agreement with Landau and Lifshitz theory of ferromagnetic resonance demonstrates the validity of this theory for optical frequencies. The authors point out that the data they have obtained refute the conclusions of some recent studies

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ACCESSION NR: AP4043661

(Breuer, W., and J. Jaumann. Ze. f. Phys. 173, 117, 1963; Clemens, K.H. and J. Jaumann Ze. f. Phys. 173, 135, 1963) in which it was stated that in magnetooptics, the magnetic permeability of pure ferromagnetic metals plays the same part as the dielectric permeability. Orig. art. has: 1 figure and 1 formula.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet (Moscow State University)

SUBMITTED: 28May64 ATD PRESS: 3102 ENCL: 00

SUB CODE: EM, OP NO REF SOV: 002 OTHER: 002

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[illegible] EWT(1)/EPA(s)-2/EWT(m)/EPA(w)-2/EEC(t) [illegible] EWP(b)
[illegible] 10/Pad [illegible] JD/HW

ACCESSION NR: AP5004370 [illegible]/65/048/001/0034/0039

AUTHOR: Krinchik, G. S.; Nurmukhamedov, G. M.

TITLE: Experimental investigation of the electron structure of nickel by the magneto-optical method

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 48, no. 1, 1965, [illegible]

[illegible] nickel, dielectric permittivity, electron [illegible] on, Fermi surface, [illegible] magneto optical effect

[illegible] The non diagonal component [illegible] the [illegible] μ region [illegible] of ferromagnetic [illegible] a magneto-optical method previ[illegible] [illegible] ZhETF v. [illegible], 1022, [illegible] for measuring the equatorial Kerr effect [illegible] detected at [illegible], [illegible], and 1.4 eV were identified with [illegible] the Fermi

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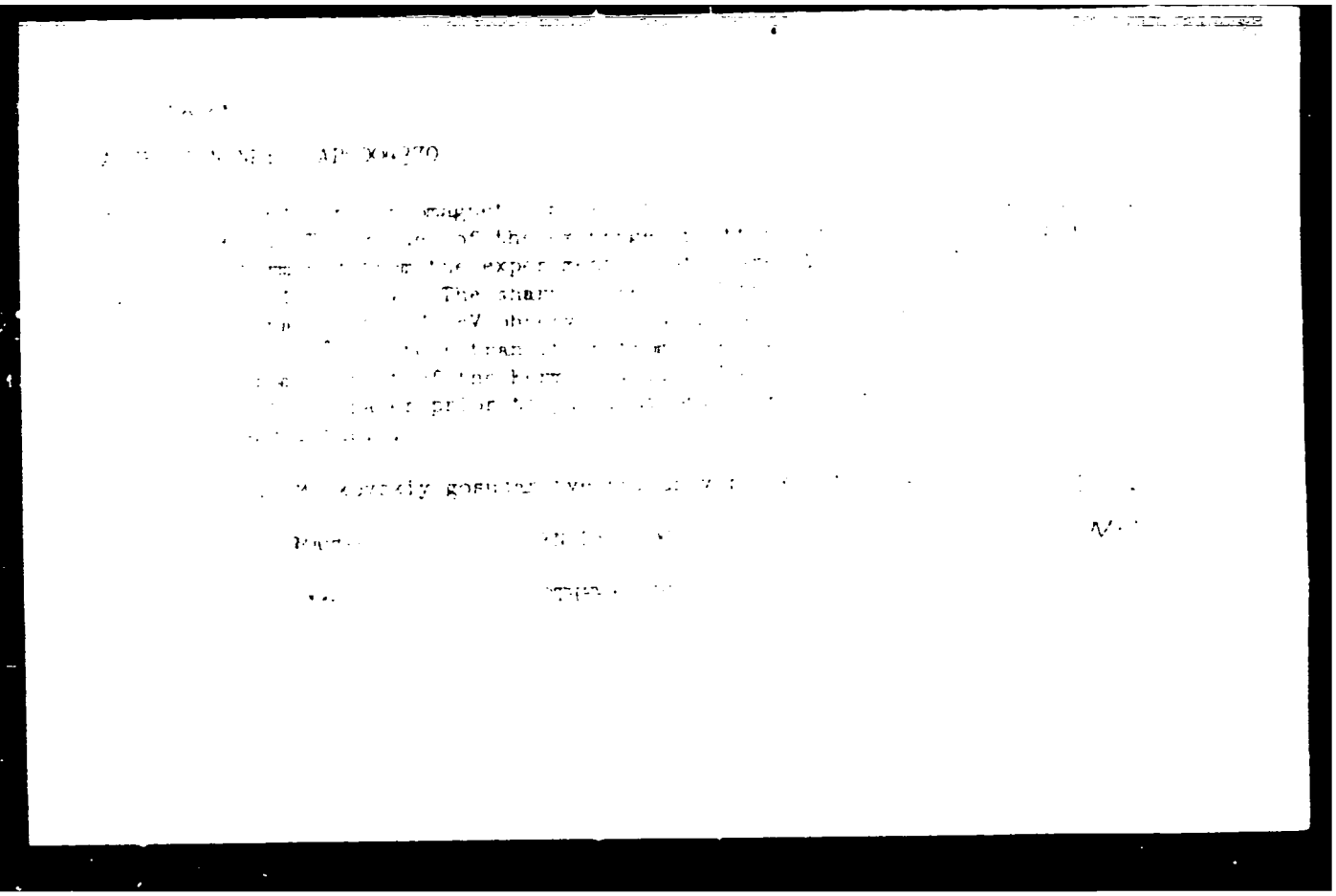

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L 6507-66 EWT(l)/EWT(m)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c)/EED(b)-3 IJP(c)
ACCESSION NR: AP5021111 JD/HW/MJW(CL) UR/0056/65/049/002/0470/0475

AUTHOR: Krinchik, G.S.; Banin, Ye. S.

TITLE: Natural frequencies of nickel and nickel alloys in the infrared spectral region

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 2, 1965, 470-475

TOPIC TAGS: nickel, nickel alloy, IR spectrum, Kerr effect, magnetooptic effect, electron transition

ABSTRACT: This is a continuation of earlier work (ZhETF v. 48, 34, 1965), in which small anomalies, with frequencies 0.3 and 0.8 ev, were observed in the magneto-optic spectrum of nickel. These anomalies were identified with direct interband transitions. The present article presents results of an experimental investigation of these anomalies in different binary alloys with nickel base and with electron concentrations close to that of nickel. The equatorial Kerr effect was measured in the infrared region of the spectrum by means of the same experimental setup as before. The nickel was alloyed with Cu, Sn, Mn, and Al. The same anomalies at 0.3 and 0.8 ev were observed and are attributed not to carrier motion, but to a single type of

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ACCESSION NR: AP5021111

electron s-d transition ($L_{3'2}$,L'_2) in two sub bands with different spin orientations. The shift of the 0.8 eV anomaly in Ni-Cu and Ni-Al alloys is attributed to the shift of right-hand and left-hand spin sub bands during the filling of the 3d nickel band. The order of magnitude of the anomaly shift corresponds in some cases to spin-orbit splitting of the 3d band in nickel. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: 30Mar65 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 001 OTHER: 004

nw
Card 2/2

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACC NR: AP6034267

SOURCE CODE: UR/0386/66/004/007/0244/0248

AUTHOR: Krinchik, G. S.; Gushchina, S. A.

ORG: Physics Department of the Moscow State University im. M. V. Lomonosov (Fizicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta)

TITLE: Influence of magnetic field on spin-orbit interaction effects in ferromagnetic d-metals

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, No. 7, 1966, 244-248

TOPIC TAGS: ferromagnetic material, spin orbit coupling, magnetooptic effect, Kerr effect, Hall effect, magnetic saturation

ABSTRACT: In view of the lack of data on magnetooptical effects in ferromagnets placed in strong magnetic fields, the authors measured the equatorial Kerr effect δ in Fe, Ni, and Co at an incident-light angle $\varphi \approx 75°$, in magnetic fields up to 40 kOe. The experimental setup was described earlier (ZhETF v. 36, 1022, 1959). The beam was made monochromatic with optical filters. The measurement error did not exceed 0.5%. The measurements have shown that the increase of the Kerr effect in the saturation region is anomalously large, greatly exceeding the corresponding increase of the saturation current. The observed effect cannot be attributed to additional magnetization of the surface layer of the sample, to saturation, or to the influence of the magnetic field on the carrier motion. It is proposed that the effect is caused by the

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ACC NR: AP6034267

direct influence of the magnetic field on the energy band structure of the d-metal, which in turn leads to a change in the value of the spin-orbit interaction. A special role may be played here by states disposed along the symmetry lines of the Brillouin zone or near the Fermi surface, the degeneracy of which is lifted by the spin-orbit interaction. This assumption is borne out by other possible manifestations of the influence of the magnetic field on spin-orbit interaction effects in ferromagnetic d-metals. The influence of the magnetic field can lead also to a dependence of the ferromagnetic Hall constant R_s on H, although this dependence is masked by the presence of the ordinary Hall effect and by the influence of the magnetic field on R_s, due to suppression of the spin waves. Experimental facts favoring this assumption are cited. It is concluded that it would be of great interest to investigate experimentally the physical effects connected with the spin-orbit interaction in d-metals in stronger magnetic fields, and to investigate the influence of a strong magnetic field on the orbital part of the g-factor. The authors thank Professor E. I. Kondorskiy for a discussion of the results. Orig. art. has: 1 figure, 1 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 08Jun66/ ORIG REF: 002/ OTH REF: 010

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

ACC NR: AP6037059 SOURCE CODE: UR/0056/66/051/005/1321/1327

AUTHOR: Krinchik, G. S.; Verkhozin, A. N.

ORG: Moscow State University (Moskovskiy gosudarstvenny universitet)

TITLE: Investigation of the magnetic structure of a ferromagnetic substance by magnetooptic apparatus with micron resolution

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 5, 1966, 1321-1327

TOPIC TAGS: nickel, iron, ferromagnetism, magnetic domain boundary, magnetic structure, magnetooptic effect, permalloy, magnetization, hysteresis loop, magnetic hysteresis, physics laboratory instrument

ABSTRACT: The authors illustrate some possibilities of employing a local method of measuring magnetization. The employed magnetooptic method and the apparatus is based on measurements of light reflections from minute regions of a ferromagnetic surface, about one square micron in area, and was described in detail earlier (PTE no. 4, 171, 1964). It makes it possible to determine the change of magnetization of the investigated local portion of the surface under the influence of some external action (field or elastic stress). The apparatus was used to measure the thickness of the transition layers between domains in nickel and iron. In the case of nickel values on the order of 0.35 μ are obtained for the thickness, close to the theoretical 0.206. In the case of iron, a value of 0.5 μ - 1.0 μ was obtained, which did not

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ACC NR: AP6037059

agree well with the thoery. The reasons for the discrepancy are briefly discussed. The authors also measured the orientation angle of the magnetization vector in surface domains 0.65 μ to 1.8 μ thick in permalloy films with a "transcritical" hysteresis loop and found it to be of the order of π/2. The authors thank Professor L. S. Palatnik and L. I. Lukashenko for supplying the samples of the "transcritical" films. Orig. art. has: 5 figures and 4 formulas.

SUB CODE: 20/ SUBM DATE: 03Jun66/ ORIG REF: 006/ OTH REF: 003

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

L 36333-66

ACC NR: AT6012893 SOURCE CODE: UR/0000/65/000/000/0147/0154

AUTHOR: Krinchik, Ye. P.

ORG: None

TITLE: Selection reaction time as a function of individual and average information

SOURCE: Sistema chelovek i avtomat (Man-automaton systems). Moscow, Izd-vo Nauka, 1965, 147-154

TOPIC TAGS: information theory, psychology, man machine relation, data processing

ABSTRACT: Experiments dealing with man's selection reactions are discussed. The author conducts a comparative study of the effect of two informational dimensions on selection reaction time. Reaction time is compared with the function for evaluating the quantity of average information $H = -\sum_{i=1}^{n} P_i \log P_i$, where P_i is the probability of the

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i-th signal and n is the number of alternate signals and with a function evaluating the quantity of information contained in each of the signals present in the individual information, I = log P, where P is the probability of the appearance of a given signal. Experimental procedure for determining the selection reaction time is discussed. Classical methods for determining selection reaction time are used. 420 experiments were run involving 6 subjects and each experiment was designed to measure 240 reactions. The same group of subjects were used in comparing the relationship between reaction time and individual information. The results of the experiments are given. The data are averaged for each subject. The results show that the two compared informational dimensions produce various effects. Comparison of data for the same range of variation, both for individual and average information (from 1 to 4 binary units) show that the results of both series may be approximated by a linear function. Analysis of reaction time for the entire range of variation in individual information shows the adversities in the functions under study. The results obtained by the author do not agree with those in the literature. Two psychological correlates are considered: the degree of signal suddenness and the degree of selection complexity. It is shown that the degree of selection complexity affects man's behavior in a selection situation more than the degree of signal suddenness. Individual

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ACC NR: AT6012893

and average information are in effect two different psychological situations. Orig. art. has: 1 figure.

SUB CODE: 05 / SUBM DATE: 02Aug65 / ORIG REF: 005 / OTH REF: 003

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

L 36331-66

ACC NR: AT6012894 SOURCE CODE: UR/0000/65/000/000/0155/0159

AUTHOR: Krinchik, Ye. P.; Rysakova, S. L.

ORG: None

TITLE: The effect of the significance factor of a signal on information processing by man

SOURCE: Sistema chelovek i avtomat (Man-automaton systems). Moscow, Izd-vo Nauka, 1965, 155-159

TOPIC TAGS: bionics, information processing, psychology, man machine ~~communication~~ relation

ABSTRACT: The authors discuss experiments designed to determine the effects of psychological factors such as the degree of signal significance on information processing by man in choice-making situations. The authors cite experiments conducted at the Department of Psychology, MGU (Otdeleniye psikhologii MGU) under the supervision of Prof. A. N. Leont'yev. The results of these experiments were published ("Voprosy psikhologii" 1962, No 6). Leont'yev studied the effect of the degree of signal significance on reaction time as a function of the quantity of average information. Similar experiments were conducted in which selection reaction time as a function of the quantity of average

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ACC NR: AT6012894

information was studied under conditions of work with signals, characterized by various degrees of significance. Various reinforcements and degrees of signal significance were used. The results of these experiments showed that changes in reaction time and rate of information processing take place in conformity with the degree of signal significance which the subject formed under various types of reinforcement. Orig. art. has: 2 figures.

SUB CODE: 05 / SUBM DATE: 02Aug65 / ORIG REF: 001

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

S/051/63/014/003/005/019
E039/E120

AUTHORS: Krindach, N.I., Kudryavtsev, Ye.M., Sobolev, N.N., Tunitskiy, L.N., and Fayzullov, F.S.

TITLE: Determination of the electronic transition moments of the Schumann-Runge band system in oxygen. I.

PERIODICAL: Optika i spektroskopiya, v.14, no.3, 1963, 351-361

TEXT: A method is developed for determining the square of matrix elements for electron transitions of molecules based on a measurement of the absorption in gases behind shock waves. The Schumann-Runge absorption bands for oxygen are obtained on a shock tube using helium as a working gas and equipped with apparatus for measuring temperature by the usual method of rotation of spectral lines; in this case by observing the resonance line of Ba II (λ = 4554 Å). An ionization probe is used for measuring the velocity of the front of the incident shock waves. The pulsed light source and the synchronizing circuit are described in detail. Spectra are recorded on ДФС-13 (DFS-13) and КС-55 (KS-55) spectrographs with glass and with quartz optics. By plotting the absorption index against wave number ν for the

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groups R(K)P(K - 4) and measuring the area under the curve, a value for the integral of the absorption index is obtained for lines of R and P form, from which is calculated the square of the moment for electronic transitions $|R_e^{n\,m}|^2$. The value of this integral obtained graphically agrees with the calculated value. These results and the analysis of possible errors will be examined in a later paper.
There are 10 figures.

SUBMITTED: May 18, 1962

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINDACH, N.I.; SOBOLEV, N.N.; TUNITSKIY, L.N.

Determining the electron transition moments of the Schumann-Runge bands for the oxygen molecule. Part. 2. Opt. i spektr. 15 no.3:298-305 S '63. (MIRA 16:10)

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

L 46301-65 EWT(1) IJP(c)

ACCESSION NR: AR5012225 UR/0058/65/000/003/D013/D013

SOURCE: Ref. zh. Fizika, Abs. 3D81

AUTHOR: Sobolev, N.N.; Antrocov, Ye.T.; Gippius, Ye.F.; Gronov, A. P.; Krindach, M.I.; Kudryavtsev, Ye.M.; Pechenov, A.N.; Sviridov, A.G.; Turitskiy, L.N.; Fayzullov, F.S.; Cheremisin, V. P.

TITLE: Experimental determination of electronic oscillator strengths of diatomic molecules

CITED SOURCE: Tr. Komis. po spektroskopii. AN SSSR, vyp. 1, 1964, 64-81

TOPIC TAGS: oscillator strength, electron oscillator, diatomic molecule, shock wave, oxygen, nitric oxide, cyan, electronic spectrum

TRANSLATION: To determine the oscillator strengths of electronic transitions of diatomic molecules, an experimental method was developed, based on the measurement of the absorption of gas behind a shock wave reflected from the end of a shock tube. By varying the velocity of the incident shock wave and by calculating the state of the gas behind the shock wave, it is possible to determine the temperature and the concentration that the molecules behind the reflected

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L 46301-65

ACCESSION NR: AR5012285

shock wave must have to permit determination of the oscillator strengths from the measured absorption. The theoretically obtained temperature was monitored by two experimental methods. A method was also developed for determining the oscillator strengths from the study of the gas behind the shock wave; these strengths were determined for the Schumann-Runge bands of oxygen, the beta and gamma systems of nitric oxide, the violet band system of CN, and the C_2 Swan bands.

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

L 64720-65
ACCESSION NR: AR5012274 UR/0058/65/000/003/D046/D046

36
B

SOURCE: Ref. zh. Fizika, Abs. 3D348

AUTHOR: Krindach, N. I.; Sobolev, N. N.; Tunitskiy, L. N.

TITLE: A method for determining the width of rotational lines and integral indices of absorption from a molecular absorption spectrum

CITED SOURCE: Tr. Komis. po spektroskopii. AN SSSR, vyp. 1, 1964, 704-712

TOPIC TAGS: line spectrum, absorption spectrum, molecular spectrum, spectrograph-[illegible], absorption coefficient

TRANSLATION: A method is developed for determining the true values [illegible] width of a rotational line and the integral indices of absorption from their observed values, which differ from the true values due to the finite resolution of the spectral instrument. The method may be used for studying absorption spectra where there is incomplete resolution of the rotational structure. This method may also be used to estimate the error in the integral absorption index which is caused by substituting a contour with "detached" limbs for the "complete" line group contour which is defined in an infinite interval.

SUB CODE: OP ENCL: 00

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L 2983-66 EWA(k)/FBD/EWT(l)/EWT(m)/EPF(c)/EEC(k)-2/T/EWP(t)/EWP(k)/EWP(b)/
ACCESSION NR: AP5024051 EWA(m)-2/EWA(h) SCTB/ UR/0057/65/035/009/1678/1684
WG/JD LJP(c) 537.523.7

AUTHOR: Krindach, N. I.; Silin-Bekchurin, I. A.; Tunitskiy, L. N.; Cherkasov, Ye. M.

TITLE: Study of a high-frequency discharge in a neon-helium laser

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 9, 1965, 1678-1684

TOPIC TAGS: gas laser, neon helium laser, hf discharge, plasma discharge

ABSTRACT: A new method is proposed for determining the current and voltage distribution along a high-frequency discharge and a study is made of the effect on laser operation of inhomogeneities along such a discharge. The method is based on the assumption that the voltage and current at any cross section of a discharge tube can be determined by the distance of that cross section from the end of the glowing portion of discharge. This assumption holds for any stationary discharge at any cross section of which electron rise due to ionization is a unity. The experiments were carried out by means of a gas laser (λ = 6328 Å) (see Fig. 1 of the Enclosure) which incorporated a fused-quartz discharge tube 1.7 cm long and 8 mm in diameter (internal) filled with a neon — helium mixture at a 10:1 ratio at a pressure of 0.8 mm Hg. Two plane-parallel quartz plates O_1 and O_2 were

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ACCESSION NR: AP5024051

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placed at the tube ends at Brewster's angle. The equivalent circuit of the discharge tube is shown in Fig. 2. The tube was placed between the two confocal dielectric mirrors M with a 2-m radius of curvature and an ~ 1% transmission around 6328 Å. The mirrors were adjusted by means of an AKT-400 collimator. The discharge tube was fed by a 30-Mc frequency from an h-f oscillator, whose voltage was supplied to 8-cm electrodes E_1 and E_2, while electrodes E_3, E_4, and E_5 (2.5 cm each) were grounded. The oscillator was L-coupled to the discharge tube and the currents I_1 and I_2 and voltages V_1 and V_2 were measured by T-22 hot-wire ammeters and S-95 electrostatic voltmeters (4-pf input capacitance) respectively. The output energy was measured by means of a calibrated thermopile. The capacity of the discharge tube, varied by a movable ground rod R placed above the tube, was determined by its distance from R. In the experiments a discharge with a maximum length of 35 cm was studied. The experimental method and results are discussed in detail and indicate good agreement with computed data. Orig. art. has: 1 table and 7 figures. [YK]

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedeva AN SSSR, Moscow (Physics Institute, AN SSSR)

SUBMITTED: 18Jan65 ENCL: 02 SUB CODE: EC

NO REF SOV: 004 OTHER: 006 ATD PRESS: 4110

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ACCESSION NR: AP5024051

ENCLOSURE: 01

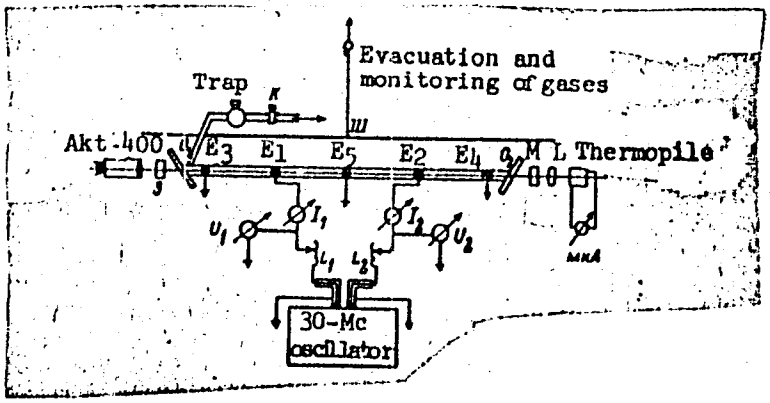

Fig. 1. Schematic of the laser

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ACCESSION NR: AP5024051 ENCLOSURE: 02

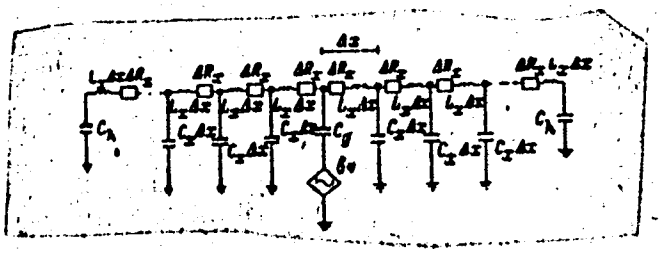

Fig. 2. Equivalent circuit of the discharge tube

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SOV/124-57-5-5206

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 5, p 15 (USSR)

AUTHOR: Krinetskiy, I. I.

TITLE: The Simplified Calculation of Some Nonlinear Systems (Upro-[illegible]shchennyy raschet nekotorykh nelineynykh sistem)

PERIODICAL: Tr. 2-go Vses. soveshch. po teorii avtomat. regulirovaniya. Vol I. Moscow-Leningrad, Izd-vo AN SSSR, 1955, pp 299-308

ABSTRACT: The author proposes a simplified method for the calculation of the parameters of control systems which contain a nonlinear link [i. e., which have an equation of the type $f(x, x', \ldots, x^{(n)}) = -F(x)$, where f is a linear and F a nonlinear function]. The function is linearized by replacing the nonlinearity $F(x)$ with a linear function hx (the quantity h depends on the amplitude, but in the calculation the maximum value of h is used throughout). The author then takes $h = h^*$, whereupon the approximate characteristic equation $\Phi(p) + h^* = 0$ has a pair of purely imaginary roots $\pm i\ \omega_0$. By substituting $d + i\ \omega_0$ in the equation $\Phi(p) + h = 0$ the author determines that root of the equation which is nearest the imaginary axis. Computational formulas are derived under the assumption that the character of the

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The Simplified Calculation of Some Nonlinear Systems

transient process is determined by that root. The proposed calculation method was checked experimentally; good agreement was found. The problems of a rigorous theoretical substantiation of the calculation method proposed are not examined.

N. N. Krasovskiy

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINETS'KIY, I.I.

Investigation of indirect tractor engine regulators. Avtomatyka no.3: 47-57 '56. (MLRA 9:11)

1. Ukrains'ka sil'skogospodars'ka akademiya.
(Tractors--Engines)

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINETS'KIY, I.I.

A special feature in the automatic control of internal-combustion engines. Avtomatyka no.4:94-95 '56. (MLRA 10:2)

1. Ukrains'ka sil's'kogospodars'ka akademiya.
(Automatic control) (Gas and oil engines)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2"

"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINETS'KIY, I.I., kerivnik seminaru

Seminar on automatisation of agricultural production processes.
Avtomatyka no.4:98-99 '56. (MLRA 10:2)

(Automatic control) (Agricultural machinery)

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

KRINETSKIY, I.I.

Dynamics of tractor engines. Avt. i trakt.prom. no.8:21-24 Ag '56. (MLRA 9:10)

1. Ukrainskaya sel'skokhozyaystvennaya akademiya.
(Tractors--Engines)

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2"

"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

IVAKHNENKO, Aleksey Grigor'yevich; [redacted], I.I., otvetstvennyy redaktor; ZIL'BAN, M.S., redaktor izdatel'stva; ROKHLINA, N.P., tekhnicheskiy redaktor

[Selfadjusting systems of automatic control] Samonastraivaiushchiesia sistemy avtomaticheskogo regulirovaniia. Kiev, Izd-vo Akad.nauk USSR, 1957. 51 p. (MLRA 10:7)
(Automatic control)

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"APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R000826510007-2

5(1) PHASE I BOOK EXPLOITATION SOV/1580

Krinetskiy, Ivan Ivanovich

Osnovy avtomaticheskogo regulirovaniya khimicheskikh protsessov (Principles of Automatic Control of Chemical Processes) Kiyev, Gostekhizdat, 1958. 233 p. 4,000 copies printed.

Ed.: O. Nemchunova; Tech. Ed.: N.Velichko.

PURPOSE: This is a textbook for students taking courses in chemical technology at polytechnical institutes. It may also be used by engineers and technicians interested in the automatic control of chemical processes.

COVERAGE: The book describes the construction and operating principle of automatic control devices and outlines some technological processes of the chemical industry along with procedural instructions for designing automatic control systems. No personalities are mentioned. There are 24 references, all Soviet.

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Principles of Automatic Control (Cont.) SOV/1580

Introduction 5

Ch. I. Dynamics of Controlled Equipment in the Chemical Industry 9
Characteristics of technological processes 10
Division of industrial processes into individual operations 10
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KRINETSKIY, I.I. [Krynets'kyi, I.I.] (Kiyev)

Simplified computation of regulation stability in nonlinear systems. (MIRA 11:4)
Avtomatyka, no.1:44-49 '58.
(Automatic control)

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KRINETSKIY, I.I. [Krynets'kyi, I.I.]

Investigating slowly damped transits in nonlinear systems [with summary in English]. Avtomatyka no.3:52-62 '58. (MIRA 11:12)

1.Institut grazhdanskogo vozdushnogo flota.
(Automatic control)

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05357
SOV/102-59-1-1/12

AUTHOR: Krinets'kiy, I.I. (Kiev)

TITLE: The Control Dynamics of Tractor Engines Subject to Variable Loading

PERIODICAL: Avtomatika, 1959, Nr 1, pp 5-17 (USSR)

ABSTRACT: The study relates to ploughing under actual conditions; the first four sections deal with the theory in simple form. Fig 1 shows the automatic control system in which a) is the block diagram and b) is the structural diagram. 1) is the plough; 2) is the engine; 3) is the regulator and 4) is the flywheel. Actual studies show that a simple centrifugal governor commonly fitted causes the speed variations to be ± 100 rpm, which has as consequence an increase in fuel consumption of 25% (see Fig 6). The transient response of such an engine can be described quite accurately by a first-order differential equation with constant coefficients (Eq 1) where T_1 is the response time of the engine, C is the fuel gain factor, rpm, for the full range of the throttle, B is the load gain factor, rpm kg, $x = \Delta\omega$ is the change in the speed, $y = \Delta h$ is the change in the position of the controller and $z = \Delta p$ is the change in the load

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The Control Dynamics of Tractor Engines Subject to Variable Loading

coordinate. Eq (2) to (4) give the values of these coefficients in terms of I, the referred moment of inertia of the engine; n the nominal speed; N_e is the effective steady-state output (which depends on n); G is the fuel consumption $b_\varphi \cdot y$ in the steady state; χ is a constant of proportionality $(1 - N_e[\partial g_e/\partial G])$; g_e is the set fuel consumption; r_k is the radius of the driving gear; i is the transmission ratio in that gear; η_m is the mechanical efficiency; η_f is the efficiency factor calculated with allowance for the speed fluctuations and ΔN_e is as defined at the top of p 7. Figure 2 shows how the load, speed and position of the throttle vary during ploughing (DT - 54 diesel with P-5-35 plough). For further purposes, it is assumed that the load varies sinusoidally (as in Eq (5), in which the symbols are obvious). Next, Eq (6) gives the transient response of the centrifugal governor, where T_2 is the response time (sec, proportional to the mass) and T_3 is another time related to the damping (sec), $F(x-\sigma y)$ is the coulomb friction law for the governor, σ is a coefficient and K is the amplification factor.

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The Control Dynamics of Tractor Engines Subject to Variable Loading

Section 3 merely collects the equations: section 4 - Eq (8) - relates to fixed load; Eq (9) gives the condition for stability. Some typical values are considered at the top of p 9; they give the critical value of σ as 16. Figure 6, b gives results for a KRTZ-7 tractor with a DT-54 engine; the speed overshoot on suddenly opening the throttle (in 2 sec) is 150 rpm and the engine takes 25 sec to settle down. Eq (10) relates to the transient response to variable load; Eq (11) is the frequency characteristic, where the new quantities are defined in terms of the others. Fig 3 gives these characteristics, where the line shown by crosses in a relates to a high-speed engine and the others relate to normal engines. Figure 3,b shows results for the DT-54 in three different gears; Fig 3,c relates to a KD-25 tractor working at normal load (1) and at 1/4 normal load (2); Fig 3,d relates to a DT-54 with the standard fuel pump (1) and with a special fuel pump (2) (rpm vertically, sec^{-1} horizontally). Fig 4 shows frequency characteristics for the regulator (friction allowed for) with the values of the constants

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The Control Dynamics of Tractor Engines Subject to Variable Loading

given below it. Fig 5 shows the structural diagram of a tractor coupled via a spring to the plough (unit 2 is the spring). Fig 6 shows the loss in power and increase in fuel consumption found for D-35 engines subject to varying load as a function of the period of load fluctuation (a) or as a function of I, the moment of inertia. The final conclusion is that the KD-35 engine is worst and the S-80 is best; high-speed diesels would be even better. The spring coupling reduces the speed fluctuations and a more advanced design of regulator (isodrome type) would reduce the fluctuations even further. There are 6 figures and 9 Soviet references.

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KRINETSKIY, I. [Krynets'kyi, I.], kand.tekhn.nauk

The rudiments of automation. Znan.ta pratsia no.1:6-7 Ja '59.
(MIRA 12:10)

(Automation)

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05358
SOV/102-59-1-2/12

AUTHOR: Krinetsky, I.I.

TITLE: Dynamics of Tractor Engine Regulation with Unfixed Loading

PERIODICAL: Avtomatika, 1959, Nr 1, pp 15-17 (USSR)

ABSTRACT: As a result of his investigations, the author proves that tractor engines under field conditions with unfixed loading consume too much fuel and are approximately 25% less efficient than when working under constant loading. To diminish the losses of power and fuel, the author recommends the following measures in consecutive order: increasing the engine constant of time, introducing an elastic hook between the tractor and agricultural machine or implement, applying an isodromic velocity regulator, and as a remote measure the application of high-revolving engines. These measures diminish the amplitude of fluctuations of the engine shaft revolutions and increase the proportionality of fuel feeding under unfixed loading, which results in a sharp rise in efficiency and economy of the machine-tractor aggregates under field conditions with this type of loading.

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KRINETSKIY, I. I., Doc Tech Sci -- (diss) "Engineering method of research into non-linear automatic systems." Kiev, 1960. 50 pp; with graphs; (Kiev Order of Lenin Polytechnic Inst); 150 copies; price not given; list of author's work on pp 48-50; (KL, 17-60, 149)

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PHASE I BOOK EXPLOITATION SOV/4326

Krinetskiy, Ivan Ivanovich

Regulirovaniye dvigateley vnutrennego sgoraniya (Regulation of Internal Combustion Engines) Moscow, Mashgiz, 1960. 192 p. 6,000 copies printed.

Reviewer: Ya. I. Drabkin, Candidate of Technical Sciences, Docent; Eds.: G. Ye. Pukhov and V. V. Mayevskiy; Chief Ed. (Southern Division, Mashgiz): V. K. Serdyuk, Engineer.

PURPOSE: This book is intended for engineers, technicians, and scientists designing, investigating, and perfecting automatic governor systems for internal combustion engines.

COVERAGE: The book presents problems in the theory and calulation of internal combustion engine governors operating under conditions of nonsteady loads. This is especially important for tractor and aircraft engines. The book gives an experimental and theoretical method, claimed to be new,

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for investigating nonlinear systems of automatic regulation. It also suggests ways of improving operational reliability, efficiency, and economy of tractor engines. The following authors in the field of automatic regulation of internal combustion engines are mentioned: V. N. Boltinskiy, V. A. Bodner, A. M. Kats, V. I. Krutov, G. M. Ulanov, G. B. Gershenovich, V. A. Kotel'nikov, N. N. Nastenko, and A. A. Grunauer. There are 33 references, all Soviet.

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KRINETSKIY, I.I., kand.tekhn.nauk; KOTOV, Ye.N., inzh.; ORZHEL', A.D., inzh.

Investigating the nonlinear static automatic control system. Avtom.i prib. no.2:10-24 '61. (MIRA 14:12)
(Electronic control)

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KRINETSKIY, I.I. [Krynets'kyi, I.I.] (Kiyev); MOZGOVA, E.A. [Mozhova, E.A.] (Kiyev); ZHALNINA, D.F. (Kiyev)

Investigation of a nonlinear astatic automatic control system.
Avtomatyka no.6:15-25 '61. (MIRA 14:12)
(Automatic control)

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