SOVRAD

A Digest of Recent Soviet R & D Articles

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This is a collection of brief abstracts on miscellaneous topics from the current Soviet technical literature. The intent is to supply a quick look at items of possible interest, including topics not necessarily named in the DARPA interest profile, as a supplement to our reportage on specified topics.

It is intended to publish this collection on a monthly basis, to continue to provide prompt coverage of numerous aspects of Soviet R&D. As an added feature, all recently acquired books will be listed as they are received. A list of source abbreviations is appended.

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INTRODUCTION

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For further information the reader is invited to call Stuart Hibben or Lee Boylan at Informatics on (301)-770-3000.

Improved Method for Isotope Separation (abstract)

A recent paper of Letokhov and Ambartsumyan reviews new and more efficient ways for laser separation of isotopes. As pointed out by them, present methods of selective excitation of atoms on molecules can be put into the two broad categories of photochemical and photophysical. The photochemical is the classical method, in which selective photoexcitation of a particle A is followed by its chemical reaction with an acceptor B, and then stable AB particles are chemically or physically segregated. This method, which has been known as long as have isotopes, has of course been enormously improved with the advent of lasers as a refined excitation tool.

Better opportunities are evidently afforded by the photophysical technique, in which selective excitation of particle A is followed by its photoionization or photodissociation, and finally the stable ionization or dissociation products are again segregated out by physical or chemical means. The entire process can thus be laser-controlled, without dependence on collision reactions, hence the latter method is statistically far more efficient for isotope separation, or for chemistry in general.

Numerous examples are cited by Letokhov and Ambartsumyan of the photophysical separation technique already tried on isotopes of Rb, HCl, NH_3, N, H and D, C_2F_3Cl, and BCl_3, by the authors and others. A brief description is given of recent such tests on isotopes of boron and sulfur, to illustrate the method. A CO_2 laser at 10^8-10^9 w/cm^2 was used; this achieves by multiphoton absorption a selective and collisionless dissociation of molecules of that isotopic state which resonantly absorbs the applied IR wavelength. In the case of boron a $^{10}B/^{11}B$ enrichment factor of 7 was thus obtained; for sulfur, using excitation of SF_6, the enrichment factor has reached 2800. [Ambartsumyan, R. V., and V. S. Letokhov. Collisionless dissociation of multiatomic molecules in a strong IR laser field, and its application in isotope separation. UFN, v. 117, no. 3, 1975, 568-570].

Laser Treatment of Water (abstract)

Biophysicists at Kazakh State University in Alma-Ata report evidence of enhanced biological activity in fresh water irradiated by laser. Per-unit yield from produce irrigated with laser-treated water is claimed to have been increased by 1-1/2 times, at a cost on the order of one cent per cubic meter of water. The enhanced water properties also remain in effect for several months after exposure. Laser-treated water has similarly been found effective in therapeutic hot springs. [Ivanov, V. Lasers and water. Trud, 4 Dec. 1975, p. 4].

Aluminates as New Laser Materials (verbatim)

Studies on spectral luminescent properties of Nd-activated mixed yttrium-gadolinium aluminates are reported. Single crystals were grown by optical zone melting in air, to obtain a $Y_{0.6}Gd_{0.35}Nd_{0.05}AlO_3$ mixture. Absorption spectra were measured at 77K, and luminescence spectra at 77 and 300 K. Experimental data was obtained in Stark splitting of Nd^{3+} lines. For several luminescence lines the temperature correlation to position and half-width were obtained in the 100-500 K interval. [Arsenev, P. A., K. E. Bienert, and A. V. Potemkin. Mixed aluminates as a new class of laser materials. PSS(a), v. 28, no. 1, 1975, 81-86. (RZhF, 9/75, no. 9D879)].

Carbyne Polymer as the Hardest Material (abstract)

A brief review is given of several of the hardest known materials and the theoretical criteria for ideal hardness are stated. These include high chemical bonding energies; alignment of bonds with the crystal axis; if a polymer material, then a high degree of polymerization; and absence of "weak spots". The carbyne form of carbon evidently comes closest to meeting these criteria.

Recent calculations show that the theoretical hardness of an ideal carbyne polymer should reach 22-23,000 kg/mm^2; this may be compared to the value of 13,000 kg/mm^2 calculated for graphite, until now regarded as the hardest material. The results assume a defect-free filamentary single crystal configuration, which is yet to be achieved. [Shmelev, V. Candidate for the hardest. Khimiya i zhizn', no. 9, 1975, 40].

New Application for Electrooptical Ceramic (abstract)

Good results have been reported on use of an electrooptical ceramic compound as a variable light filter. The filter is identified as TsTSL, which stands for a solid solution of lead zirconate and lead titanate with a fraction of lead atoms replaced by lanthanum; the optimum makeup was found to be 65% zirconate-35% titanate, with 8% La substitution. Tests on 100-150 μ thick polarized specimens showed a controllable refractive index yielding interference bands over the entire visible spectrum when a field of 0.5-4.5 kv/cm was applied to the specimen. [Vasilevskaya, A. S., I. M. Grodnenskiy, I. A. Slepkov, and A. S. Sonin. Electrically controlled light filter based on an electrooptical ceramic. RiE, no. 9, 1975, 1913-1916].

Test of Nichrome-Tungsten Composite (verbatim)

Cyclic strength tests are reported on a sheet composite 1 mm thick, comprising a nichrome matrix reinforced with unidirectional tungsten fibers of 0.5 mm diameter. Tests were done at room temperature. It was found that the cyclic strength of this single-layered configuration is considerably lower than for the nonreinforced material, which is attributed to the effect of

residual stresses occurring during the composite fabrication. Metallographic analysis shows traces of shearing in composite specimens subjected to fatigue tests. [Gayduk, V. V., L. V. Morozov, and Yu. V. Sukhanov. Cyclic strength of a sheet composite with tungsten reinforcement. Problemy prochnosti, no. 3, 1975, 106-109. (RZhMekh, 7/75, no. 7V1306)].

Pulse Loading of Composites (verbatim)

The effect of a planar explosive charge on the strength of composite materials is studied. Using local x-ray analysis the authors examined the transition layer in a composite made by explosive welding of type AMG-6 fiber material with type Kh18N9 filaments. It was determined that the composite's hardness is strongly affected by the resulting increased hardness of the reinforcing filaments, and that the transition zone appeared as a highly dispersed mixture of a solid solution consisting of aluminum plus the fiber material. [Krupin, A. V., V. Ya. Solov'yev, V. V. Kuprina, A. G. Kobelev, and V. N. Afanas'yev. Effect of pulse loading parameters on properties of fiber composite materials. IN: Nauch, trudy Mosk. in-t stali i splavov. No. 81, 1975, 243-248. (RZhMekh, 6/75, no. 6V1312)].

New Fabrication of Polymer Tubing (abstract)

A polymer recently developed for use in handling highly active chemicals has been limited by difficulties in fabricating long lengths of it for piping. Now the "Plastpolimer" Combine announces that this problem has been overcome, and that sections of virtually any length can be made. Evidence cited is a 700 meter section produced for transport of concentrated nitric acid. The polymer, identified only as type F-4, is rated as more durable than alloyed steel. [Polymer tubing. Leningradskaya pravda, 10 Oct. 1975, p. 4].

More on Glassy Semiconductors (abstract)

Developments on glassy semiconductors, notably on chalcogenides at the Joffe Institute, continue to get frequent publicity. Among the useful factors cited for them are ease of fabrication, since they are far less susceptible to impurity degradation, and their stability in a radioactive environment. A wide range of application is seen for these new semiconductors, such as use in vidicons; in non-silver photography; as memory elements and other digital applications, and as holographic elements. A particularly attractive feature is their transparency to IR as well as visible radiation, in contrast to ordinary glasses. [Koptev, Yu. Glasses instead of crystals. Leningradskaya pravda, 23 Nov. 1975, p. 2; Il'inskaya N. An ordinary and extraordinary glass. Krasnaya zvezda, 13 Nov. 1975, p. 4].

Superconducting IR Bolometer (verbatim)

A description and test results are given for superconducting Sn and Pb-Sn film bolometers, together with their amplifying and registering elements. The bolometers were 1 x 10 mm and had a time constant of 7 milliseconds. At a modulating frequency of 12.5 Hz, the Sn bolometer achieved an equivalent noise level of 3×10^{-12} w/Hz$^{1/2}$ at an aperture of $\pi/30$. With added gold black, these figures became 4×10^{13} w/Hz$^{1/2}$ and $\pi/600$, The Pb-Sn types were operated without helium pumping, and showed a noise level of 1.3×10^{-11} w/Hz$^{1/2}$. The bolometer receiver/amplifier system operates with a high-resolution monochromater in the 50-120 micron range. [Pankratov, N. A., G. A. Zaytsev, and I. A. Khrebtov. Superconducting bolometers for long-wave IR spectroscopy. IN: Sb. Teplov. priyemniki izlucheniya. Leningrad, 1974, 122-133. (RZhRadiot, 9/75, no. 9Ye452)].

Conferences on Artificial Intelligence (extract)

In recent years a seminar series entitled "Artificial Intelligence and Problems in Its Construction" have been held in the USSR. In a recent seminar in this series, Academician N. P. Bekhtereva presented a paper entitled "Information coding in the Human Brain." The paper presents new data in the study of the semantic code of words, with an analysis of approaches to this problem, and the simplest logic operations performed by the brain are examined. Papers by M. M. Botvinnik, R. S. Kontorov, and A. A. Sokolov were also read.

Another conference (Fourth International Joint Conference on on Artificial Intelligence) was recently held in Tbilisi and was attended by 500 delegates from 35 nations. A paper by Academician V. V. Chavchanidze dealt with the problem of intellectual activity control through psychoheuristic programming. Several books marking the opening of the conference were published: "Fundamentals on the Theory of Heuristic Decisions - An Approach to the Study of Natural Intelligence and to the Construction of Artificial Intelligence" by Ye. A. Aleksandrov (dealing with simulation of higher intellectual functions of the brain by computer); "Heuristic Analysis of Information Structures" by A. V. Napalkov, N. V. Tselkovaya, and I. F. Moiseyev (covers the use of information structures for analyzing large systems, e.g., man); and a short work, "Man-Computer Dialog" by A. M. Dovgyallo and A. A. Stogniy. [Sukharebskiy, L. Artificial intelligence. Meditsinskaya gazeta, 17 Dec. 1975, p. 3, cols. 1-5].

Increased Emphasis on Robotics (abstract)

A continuing Soviet interest in theory and application of robot technology is seen in the recent reference to creation of a Scientific Advisory Council on the Theory and Structural Principles of Robots and Manipulators, which apparently is a replacement or rework of an earlier Commission carrying

the same title. The recently cited Council is under the Academy's Department of Mechanics and Process Control. Its general mission is to develop possibilities of so-called third generation robots, which would have a high level of decision-making ability and thus could work under merely supervisory control.

The objective is to get wider and more sophisticated use of robots in remote or hostile environments (space, undersea, radiation, etc). as well as to free more and more human workers from generally programmable productive tasks. The Academy's Presidium has broken down the topics of concern as follows:

- o mechanics of robots
- o development of robot control systems
- o activation of robots (sensitization)
- o artifical intellect for robots
- o man-robot interaction
- o applying computer complexes to robots
- o theoretical and physical modeling of robots.

The Academy looks for a well-coordinated effort among its facilities, industry, and institutes of higher learning, to pursue this effort.

The subject of robotics is also discussed briefly by G. S. and D. A. Pospelov, as part of a more general review article on the study of artificial intelligence. They note that development of an "integral robot" with a degree of intellectuality approaching man's would presently require a staggering cost, estimated by U.S. experts as on the order of the programming costs for the Apollo space project. One main difficulty appears to be the problem of processing sensory data, for example visual stimuli. It is suggested that human seeing involves an intellectual component that raises the action above the merely "photographic" response of the robot.

Several programs are in progress under the Academy's Council on Artificial Intelligence. These mentioned include "Dialog", attempting to model dialogs in approximately natural languages, with subprograms "Rita", "Dilos" and "Priz" on special dialog applications; "Situatsiya", a program for modelling control of complex systems; "Konstruktor", for applying artificial intelligence to advanced systems design, and "Robot Intellekt", intended to develop advanced-generation robots capable of independently solving complex problems posed by a human operator. [Robotics: status and prospects. VAN, no. 10, 1975, 11-12; Pospelov, G. S., and D. A. Pospelov. Artificial intelligence. ibid., 26-36].

Soviets Exhibit New Fish-Finding Sonar (verbatim)

The "Priboy-101" fish-finding sonar was shown recently at a Soviet sponsored international fishing-industry trade fair. This sonar is said to be capable of detecting single objects at depths to 1200 meters, while its maximum range is 3 kilometers. ["Priboy" searches for fish. Nauka i zhizn', no. 11, 1975, 117].

Photogrammetrical Measurement of Water Level (verbatim)

A method is described which has been applied to measuring variations in water level of a 1 km wide river. The technique uses photos from an aerial camera with f = 100 mm on an IL-14 aircraft, equipped with autopilot, radio altimeter and gyro stabilization. A straight-line technique is used in processing the photos; no ground reference is used, with the water level serving as horizon. [Molchanov, A. K. Using photogrammetry for measuring water level variation at an obstacle. Tr. Gos. gidrol. in-t, 1975, no. 205, 62-65. (RZhGeod, 5/75, no. 5.5].183)].

Sodium-Sulfur Traction Battery (abstract)

Soviet and non-Soviet efforts at development of high-energy storage batteries for electric vehicles and other (unspecified) applications in modern technology are reviewed, based on available data up to 1974. Advantages and defects of known high-energy electrochemical systems are discussed.

The theoretical basis of operation of a sodium-sulfur storage battery with beta-alumina electrolyte is described and the problems of this particular battery development are outlined. Soviet experimental data are given on electrochemical characteristics and cathode design of a rechargeable sodium-sulfur test cell. Preliminary research data have confirmed the workability of a sodium-sulfur storage battery. At 1.5 v potential, about 500 mA/cm^2 current density has been obtained. Using the cited research data, construction of a Na-S storage battery with 150 w-hr/kg usable energy density is judged to be feasible. Realization of such a battery hinges on development of a corrosion resistant and mechanically strong solid electrolyte, the beta-alumina electrolyte-insulating ceramic contact, and a reliable sulfur electrode. [Lidorenko, N. S., V. I. Moiseyev, G. F. Muchnik, I. I. Grudyanov, O. I. Degtyarev and A. A. Lanin. Problems of development of sodium-sulfur storage battery, a promising power source for traction. IAN SSSR. Energetika i transport, no. 4, 1975, 102-111)].

Progress With Tokamaks (abstract)

Operation of the recently tested Tokamak-10 (T-10) is described in a newspaper interview. T-10 in its first trials sustained a thermonuclear plasma for times given variously as several milliseconds and one or two hundredths of a second; operation was described as better than expected.

The design parameters of the next generation, T-20, are expected to include double as dense a plasma as T-10, and a plasma lifetime on the order of one second, at 70 to 100 million degrees temperature, to achieve energy equilibrium. Barring unforeseen problems, it is hoped to have T-20 operative in the mid-1980's. [Melenevskiy, I. Tests of the Tokamak. Trud, 13 Dec. 1975, p. 5].

New Output From the U-52 MHD Generator (abstract)

A new channel of the Institute of High Temperature's U-25 MHD generator was fired up on 18 March 1975, developing a stable output of 12.5 megawatts. This exceeded calculated levels, and doubles the previous maximum output. An overall view of the U-25 installation is included. [In the Academy's Institute of High Temperatures. Vestnik Akademii nauk, no. 8, 1975, 126].

Analysis of Very Low Frequencies (verbatim)

The possibility is evaluated for using time scale conversion in the analysis of very low frequencies; the technique is based on analysis of systematic error. Calculated data are presented on the dynamic range of experimental spectral analysis, in the form of graphs and tables. [Beshkarev, A. V., and L. F. Karpenko. On the problem of dynamic range of spectral analysis of very low frequencies. IN: Sb. Metody i aparatura spekt. i korrelyats. analiza slozhn. signalov, No. 1, Taganrog, 1974, 168-175. (RZhRadiotekh, 8/75, no. 8A319)].

Soviet Experience in E-M Propagation in Earth (abstract)

In a review of Soviet experimental and theoretical work on e-m wave propagation in the earth's crust, the authors note the application to practical problems. These include prospecting for oil and gas, study of soil structures at building sites, radio communications in mine tunnels, structure of underground antennas, and others. The successful Soviet studies in this area, dating from the start of the century, are emphasized, e.g the work of A. N. Tikhonov, who showed the feasibility of measuring core and mantle properties through studies of Earth's natural e-m field.

Experimental studies have been done on rock properties at frequencies up to 10^7 Hz, at temperatures, pressures and humidities corresponding to depths of several dozen kilometers. Methods have been developed for calculating e-m fields in plane and spherical strata. Test equipment in use provides for sounding with both c-w and pulsed signals. [Zvereva, Ye. V., A. M. Ryzantsev, and D. N. Shachsuvarov. Soviet theoretical and experimental work on electromagnetic wave propagation in the Earth's crust. URSI Symp. on E-M Wave Theory, London, 1974, 265-266. (RZhRadiot, 8/75, no. 8A217)].

Electronic Antenna Scan (verbatim)

A method is described for electrical generation of an antenna scan, based on simultaneous frequency shift of two driver generators by one of several techniques. A principal feature of the method is that it permits radiation from a standard waveguide feed without requiring a radiator matrix. Experimental results with a test model are given. [Osovitskiy, A. N. A new method for electric scanning and its possible use in the millimeter and submillimeter ranges. Sb. Vses. simpoz. po rasprostr. submillim i millimetr. voln v atmosfere Zemli i planet, 1974. Tezisy dokladov. Moskva-Gorkiy, 1974, 79-82. (RZhRadiot, 6/74, no. 6B93].

Basics of Side-Look Radar (abstract)

A general review is given of the principles of side-look mapping radars. The technique is considered in terms of the two general types, i.e. the extended fuselage-mounted antenna and the synthetic aperture antenna, both of which are in wide use. Resolution of the former type is given as 10 to 20 meters in range (normal to flight path) and 15-20 m in azimuth (flight direction); the synthetic aperture type can attain 3-5 m resolution over the entire view field.

Coordinate conventions are given for aircraft, antenna and image, and a typical block diagram of the dual fuselage-mounted type is included. Equations are developed for determining coordinates of image points. With techniques now developed to give scales of 1:250,000 or finer, this method is seen as gaining increasing acceptance for use in precise ground mapping. [Zhurkin, I. G., and Yu. N. Korneyev. Relation of observer coordinates to image coordinates in fuselage-mounted side look radars. IVUZ Geodeziya i aerofotos"yemka, no. 6, 1974, 43-52].

New Analytical Solutions for Open Resonators (abstract)

A review is given of recent theoretical work on studies of open resonators, formed by parallel or inclined plane reflectors. An analytical solution of the integral equations which describe processes in open resonators exists only for the simplest cases; generally such solutions are obtained by computer using numerical methods.

It is shown that a geometrical optics calculation of a two-dimensional open resonator reduces to solving a system of nonlinear difference equations with constant coefficients. Using nonlinear theory the authors calculate ray oscillation in the resonator, and examine resonant instability of oscillations caused by nonlinearity at $\nu = \pi/2$ and $\nu = 2\pi/3$, where ν = oscillation frequency. The practical effect of this instability is discussed. A correction is computed for nonlinear effect on oscillatory frequency in resonators with circular or parabolic mirrors. It is shown that resonant instability causes a sharp drop in Q in the case of confocal mirrors; this accounts for the sharp dips in experimental Q values with mirrors of varying separation. [Melekhin, V. N., and L. A. Vaynshteyn. Open resonators: new analytical solutions. URSI Symp. Electromag. Wave Theory, London, 1974, 27-34. (RZhRadiot, 8/75, no. 8B158)].

Soviets Review U. S. Electronic Surveillance (abstract)

A recent Soviet monograph gives a detailed account of U. S. electronic surveillance, including its history, organization and operation under the direction of civilian and military branches of the U. S. government. The major efforts of CIA and NSA are cited, along with the individual DoD intelligence branches, the FBI, AEC and others. Mention is also made of electronic spying done by the UK, West Germany, Israel and Austria, but the main treatment is reserved for the U. S. as the major organizer of a world-wide surveillance network.

A review of radar and antenna basics is given, and numerous concrete examples are cited of U. S. land, sea and spaceborne surveillance equipments. Those mentioned include the ships Liberty and Pueblo and the West German vessels Oste and Trave in the Baltic; aircraft such as the EC-121; the EB-66F carrying the AN/ASR-06 system; and the new SR-71; the AN/APS-109 system is cited here as well. Spy satellites cited include Midas, Samos and others, with the Ferret variant of Samos discussed in more detail. Details of numerous ground-based transmitting, receiving and signal processing equipments are also discussed and operating specifications listed.

The chapter breakdown of the book is as follows:

- o General characteristics of electronic surveillance
- o Use of radio frequencies in surveillance
- o Receiving antennas in surveillance
- o Apparatus for search, intercept and analysis of r-f signals
- o Radio direction finders in electronic surveillance

In both introduction and conclusion, the author deplores the sinister nature of this espionage program on the part of the capitalist world, and urges his readers to increase their efforts in all possible ways to counteract it. The book cites 70 references from U. S., European and Soviet sources. [Vartanesyan, V. A. Radioelektronnaya razvedka (Electronic intelligence). Moskva, Voyenizdat, 1975, 255 p.].

Soviet View of ARPANET (abstract)

The history of ARPANET has been reviewed in a recent monograph published by the Academy's Institute of Applied Mathematics. The account is based on U. S. sources, primarily professional and commercial computer journals, in which the growth of ARPANET was reported starting in the 1960's. The original concept, the early development problems in time-sharing and compatibility, and the growth of the system up through about 1973 are discussed in straightforward factual style, evidently largely using verbatim excerpts from the cited U. S. sources.

In view of the success of ARPANET, the authors see a broad future expansion of its coverage, particularly since the projected outlay of U. S. funds for communications technology is growing so rapidly; cited figures are $1.45 billion for 1972-3, projecting to $70 billion by 1980. The development of analogous networks in Canada, the U. K., France and Spain is cited, as well as U. S. commercial analogs such as Telenet.

Lapsing into polemics, however, the authors warn in closing that to extrapolate a system like ARPANET world-wide would pose a number of social, political and military problems to the capitalist world, and that only in a society free of class antagonisms could such problems be resolved. [Drozhzhinov, V. I., and A. N. Myamlin. Structure of the ARPANET network of computer centers. Survey. Moskva, In-t prikladnoy matematiki AN SSSR, 1975, 55 p.]

Recent Publications

Braginskiy, V. B. et al. Izmereniye malykh sil v fizicheskikh eksperimentakh (Measuring small forces in physics experiments). Moskva, Nauka, 1974, 151 p. (RBL, 7-8/75, no. 493)

Bychkov, S. I., et al. Lazernyy giroskop Laser gyroscope. Moscow. Sovetskoye radio, 1975. 421 pp. (RBL, 9-10/75, no. 793)

Chernov, L. A. Volny v sluchaynoneoduorodnykh sredakh (Waves in randomly disordered media). Moskva, Nauka, 1975, 170 p. (LC-VKP)

Eksperimental'nyye i teoreticheskiye issledovaniya otrazhennykh voln. Sbornik statey (Experimental and theoretical studies of reflected waves. Collection of articles). Novosibirsk, Izd-vo Nauka, Sib. ot-niye, 1975, 148 p. (LC-VKP)

Elektronnyye kharakteristiki i elektron-fononnyye vzaimodeystviya sverkhprovodyashchikh metallov i splavov [Trudy ordena Lenina fizicheskogo instituta im. P. N. Lebedeva. Tom 82]. Electronic characteristics and electron-phonon interactions of superconducting metals and alloys [Transactions of the Order of Lenin Physics Institute im. P. N. Lebedev. Volume 82]. Moscow, Nauka. 1975. 103 pp. (RBL, 7-8/75, no. 502)

Fizicheskaya khimiya kondensirovannykh faz, sverkhtverdykh materialov i ikh granits rasdela (Physical chemistry of condensed phases of superhard materials and their boundary limits). Kiyev, Naukova dumka, 1975, 231 p. (LC-VKP)

Frolov, I. T. Progress nauki i budushcheye cheloveka: opyt postanovki problemy, diskussii, obobshcheniya (Scientific progress and the future of man: an attempt at stating the problems, discussions and generalizations). Moskva, Politizdat, 1975, 222 p. (LC-VKP)

Gudzenko, L. I., V. V. Yevstigneyev, and S. I. Yakovlenko. Printsip plazmennogo lazera v rentgenovskom diapazone (Principle of a plasma laser in the x-ray range). Preprint FIAN no. 4, Moskva, 1975, 45 p. (KLDV, 8/75, no. 14075)

Ivanova, T. S. Metod resheniya zadachi magnitogidrodinamicheskogo dinamo (Method for solving the problem of the magnetohydrodynamic dynamo.) Moscow. Nauka. 1975, 25 pp. (RBL, 9-10/75, no. 550)

Karbid kremniya, svoystva i oblasti primeneniya (Silicon carbide: properties and areas of application). Kiyev, Naukova dumka, 1975, 79 p. (LC-VKP)

Klimenko, A. Yu. Nazemnyy transport budushchego (Surface transport of the future). Moskva, Izd-vo Mosk. rabochiy, 1975, 118 p. (LC-VKP)

Korshak, V. V., et al. Bororganicheskiye polimery (Organo-boron polymers). Moscow. Nauka, 1975, 254 pp. 1.27. (LC-VKP)

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SOURCE IDENTIFICATION

PSS	-	Physica status solidi
RiE	-	Radiotekhnika i elektronika
RZh Mekh	-	Referativnyy zhurnal. Mekhanika
RZh Radiot	-	Referativnyy zhurnal. Radiotekhnika
UFN	-	Uspekhi fizicheskikh nauk
VAN	-	Akademiya nauk SSSR. Vestnik