



Science and Technology Perspectives

S&T DEVELOPMENTS:

Eureka (FRG) The Research Ministry has allocated DM 400 million by 1995 to Eureka (European Research Coordinating Agency), most of it to Eurolaser. The first phase will cover phototronics, Euronet and Eurotrac. In June, five to 12 additional projects will be proposed, with industry participation expected.

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Ultrafast Liquid Crystals (Hungary) Researchers at Hungary's KFKI (Central Physics Institute) have developed ultrafast liquid crystals that display within one-thousandth of a second.

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..... Continued on Page 1

IN THIS ISSUE:

Hungary/USSR: Development of Aerospace Electronics, Commercial Uses Sought Page 3

Hungarian engineers have made major contributions in the development of Soviet instrumentation, particularly for the aerospace industry. A Hungarian-Soviet team is now working to commercially apply expertise gained in the aerospace electronics field.

Japan: Increased Interest in Light-Water Reactor Development for the 21st Century Page 4

Japan may place higher priority on development of light-water reactors compared to fast breeder reactors to meet future energy needs.

Japan: EPROM Semiconductor Manufacturers May Increase Market Share This Year Page 5

Japanese semiconductor manufacturers may be positioned to catch up with their U.S. counterparts in the EPROM market this year by entering the market at the same time and by offering a greater variety of products.

USSR/Bulgaria: New Joint Venture To Co-Produce Machining Centers Page 7

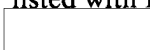
The Machine-Tool Building Association in Ivanovo and the EMM Machine-Tool Building Association in Sofia will jointly produce machining centers for the world market.

USSR: Increased Interest in Seabed Manganese Nodules..... Page 8

The number of articles in the Soviet press that relate to physicochemical studies of manganese nodules and to nodule-mining equipment and methods has more than doubled in the past two years.

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PERSPECTIVES selections are based solely on foreign press, books and journals, or radio and television broadcasts. The materials used in this publication may be abstracted or translated in full and published in FBIS serial reports. Comments and queries regarding this publication may be directed to the Center Chief, to individuals at the numbers listed with items, or to the Science and Technology Center at



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FOR OFFICIAL USE ONLY***S&T DEVELOPMENTS:***

S&T DEVELOPMENTS highlights worldwide S&T events in the foreign media. Items followed by an asterisk will be published by FBIS. Contributors' initials and extensions also are provided.

Denationalization	(France) An 8 April report puts Matra and Dassault on the new French Government's denationalization list. The government had purchased 51 percent of each of these arms manufacturers prior to the 1982 nationalization push. This policy shift may indicate that the government plans to make a clean sweep in its denationalization efforts. <input type="text"/>	STAT
Composite Materials	(FRG) Messerschmitt-Boelkow-Blohm has developed an in-use crack sensing method (optical fiber networks interlaminated within composite materials). Applications include aircraft components in areas difficult to test or large surfaces such as in carbon fiber composite Airbus structures. <input type="text"/> <input type="text"/>	STAT STAT
Optical Switch	(Sweden) L M Ericsson Information Systems plans to have its optical semiconductor switch on the market by the 1990's. It will make fully automated telephone exchanges possible, has a wide range of band widths, and utilizes the broadband optical fiber medium to prevent overloading. All functions are located on a single lithium niobate chip. <input type="text"/>	STAT
Silicon Wafers	(GDR) The first section of a new silicon wafer manufacturing plant went into operation on 31 March at the Spurenmetalle Freiberg Works. The plant, which will quadruple GDR silicon wafer output, has "zone floating installations" and a computer-controlled abrasive cut-off machine, enabling the production of larger-diameter, higher-quality wafers. <input type="text"/>	STAT
Fiber Optics	(Brazil) On 29 March the Brazilian Government was reported to be negotiating a four-year export contract with "East European countries" for 1,500 km of fiber optic cable manufactured by Telebras (Brazilian Telecommunications, Inc.). The sale of 400 km of submarine fiber optic cable to the USSR over a two-year period has been contracted by ABC-TAL. <input type="text"/> <input type="text"/>	STAT STAT

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Turbine Technology

(USSR) A. P. Zaytsev, Deputy Minister of Power Machine Building, has stated that during the 12th Five-Year Plan turbine production will be facilitated through automated welding and computer-controlled production bays. Turbine components will be machined in highly automated complexes equipped with large NC machining centers and multiple-station transfer machines.

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Background Gamma Radiation

(PRC) In a 1982-1984 nationwide study by China's Ministry of Public Health to determine the possible effects on humans of naturally occurring gamma radiation, measuring stations were set up in many places including Inner Mongolia, the Tibetan Plateau, and the Turpan Basin, as well as at nuclear power plants.

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FOR OFFICIAL USE ONLY**HUNGARY/USSR: DEVELOPMENT OF AEROSPACE
ELECTRONICS, COMMERCIAL USES SOUGHT**

Key Points: Hungary has long provided special instrumentation for various Soviet projects including those for the INTERKOSMOS spacecraft and for the international Vega project. A Hungarian-Soviet team is now working to commercially apply the expertise gained in the joint manufacture of aerospace electronic equipment. Information on potential products and markets is not available, however.

A NEPSZAVA article of 19 March reports that Hungarian institutions, especially the KFKI (Central Physics Research Institute), have been playing an important role in fabricating instruments and other equipment for the INTERKOSMOS and Vega projects. KFKI is coordinating the work of BME (Budapest Technical University), the Academy Institute of Astronomical Research, and the Institute of Surveying. The paper quotes Andras Gschwindt, chairman of the BME Microwave Department as stating that, in addition to the data-collection equipment produced prior to the Vega program, the department has developed several "energy-distributing basic units and telemetric transceivers for INTERKOSMOS on-board use." He adds that most Vega instrumentation was either developed or assembled at KFKI. NEPSZAVA describes various systems, some designed specifically for Vega, others already used in Soviet aerospace research:

PLAZMAG—This system consists of several sensors, data processors, and controls that measure charged particles in the vicinity of Halley's Comet. The system can detect interactions between the comet and the solar wind.

TUNDE—This system collects data on cosmic radiation near the comet and measures the energy distribution of charged particles emitted by the sun. Its sensors collect data evaluated by a microprocessor system.

ING-DUSMA—ING was co-produced by the FRG and the United States. It analyzes the chemistry of "neutral" gas particles. DUSMA records the distribution of cosmic dust. Hungary designed and fabricated the ground control equipment for this system.

TV SYSTEM—The optical and mechanical parts of this system were produced by the USSR and France. KFKI together with BME and the department of astronomy of Lorand Eotvos University supplied the electronic equipment and wrote the computer program. KFKI assembled and adjusted the system and calibrated the optics.

The party daily NEPSZABADSAG of 7 April reports that a Hungarian-Soviet group has been established at KFKI to find ways of commercially applying the expertise gained in the manufacture of extremely reliable electronic equipment originally designed for aerospace research. Established as a cooperative venture between the Hungarian and Soviet academies of science, the group is composed of physicists and engineers from the Soviet Space Research Institute and KFKI. The group will be under the direction of Ferenc Szabo, executive director of KFKI. Group members will further develop the high technology instruments created for the Vega program. A laboratory has been set up at KFKI where the group will work specifically on problems of electronics, according to NEPSZABADSAG. Work has begun on three projects with others in the offing. In addition, the group will design new space instruments.

NEPSZABADSAG also reports that the Hungarian and Soviet specialists are building the on-board computer that will guide a landing craft during the mission to Mars and Phobos in 1988.

(A translation of the sources cited in this article will appear in EUROPE REPORT: SCIENCE AND TECHNOLOGY.)



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JAPAN: INCREASED INTEREST IN LIGHT-WATER REACTOR DEVELOPMENT FOR THE 21ST CENTURY

Key Points: Japan may place greater emphasis on development of light-water reactors (LWRs) to meet its future energy needs. According to the press, the Ministry of International Trade and Industry (MITI) has released a study emphasizing the importance of LWR development for the 21st century. Japan's increased interest in LWRs and the conspicuous lack of Tokyo press coverage of fast breeder reactors (FBRs) may be an indication of Japan's lowered expectations for FBR development in the near future.

According to NIHON KEIZAI SHIMBUN of 11 March and DENKI SHIMBUN of 31 March, MITI has released a study entitled "Strategies For LWR Technology Advancement in the 21st Century." The press reports that the study was compiled by MITI's Advisory Committee for Nuclear Power. The study stresses the importance of developing new LWRs to meet Japan's future energy needs, defines the technological goals, and estimates the funds required.

The press indicates that the study recommends development by the year 2005 of a dramatically new LWR, nicknamed the next-generation LWR (NGLWR). The technological goals for NGLWR include:

- a 10 percent reduction in the cost of generating power
- an operating utilization rate of 90-95 percent
- a 10 percent reduction in the use of uranium

The study estimates that 100 billion yen will be required for NGLWR development.

The study also recommends the development of advanced boiling water reactors (ABWRs) and advanced pressurized-water reactors (APWRs), and improvement of existing LWRs. The study estimates development funds for ABWRs and APWRs to be 70 billion yen, and funds for improving existing LWRs to be 60 billion yen.

According to various other Tokyo press sources, MITI has accepted the proposals recommended in the study and has decided to implement them starting in FY86. The press reports that MITI plans to develop a new comprehensive plan and create an advisory organization to achieve these policy goals.

The April issue of GENSHIRYOKU KOGYO reports that Japan hosted the first International LWR Conference in Tokyo on 10-11 April. This is another indication that Japan has increased its interest in LWR development. At the same time, no noteworthy press coverage on FBRs has been observed lately. All of these phenomena may point to Japan's lowered expectations for the development of FBRs in the near future.

(A translation of the sources cited in this article will appear in JAPAN REPORT: SCIENCE AND TECHNOLOGY.)



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FOR OFFICIAL USE ONLY**JAPAN: EPROM SEMICONDUCTOR MANUFACTURERS MAY INCREASE MARKET SHARE THIS YEAR**

Key Points: Japanese semiconductor manufacturers may make gains over their U.S. counterparts in the EPROM market this year. They have entered the market at the same time and are prepared to offer a greater variety of products. The Tokyo press reports that Hitachi, NEC, and Fujitsu are now marketing 1 megabit erasable, programmable read-only memory (1M EPROM) chips, and Mitsubishi Electric, Toshiba, and Oki will soon enter the market with a greater variety of product lines. Specifications of Japanese 1M EPROM products as well as products soon to be marketed are presented in the following table.

The Tokyo press, including NIKKEI SANGYO SHIMBUN of 24 March, reports that Hitachi, NEC, and Fujitsu have completed development and recently began marketing 1M EPROM products. The press indicates that the Japanese have caught up with their U.S. counterparts in the development of 1M EPROMs and have entered the market almost simultaneously with them. U.S. manufacturers have traditionally taken the lead in the EPROM market by aggressive product development and early market entry.

In addition to these three Japanese manufacturers, according to the press, Mitsubishi, Oki, Toshiba, and possibly Matsushita Electronics will soon offer 1M EPROM chips along with a greater variety of Japanese 1M EPROM product lines. This will make Japanese products more attractive and competitive.

According to the press, last year's EPROM market volume was \$875 million. AMD and Intel of the United States each had a market share of more than 20 percent, and Japanese manufacturers had a combined share of about 40 percent. The press indicates that worldwide sales this year are expected to reach \$1 billion.

NIKKEI ELECTRONICS of 10 March, NIKKAN KOGYO SHIMBUN of 11 March, and NIKKEI SANGYO SHIMBUN of 24 March report that Hitachi, NEC, and Fujitsu are offering three types of 1M EPROM products: a chip with a 64K word x 16 bit structure, one with a 128K x 8 bit structure, and another capable of switching back and forth between a 64K x 16 and a 128K x 8 structure. All have power-saving complementary metal oxide semiconductor (CMOS) structures. Their design rules are at the 1.2-1.5 micron level. All the chips can be written on at 12.5 volts. This may become the industry standard, according to the press. The chips require different lengths of time to be written on—30 seconds to 120 seconds per megabit. The products use 100-550 microwatts of electricity when waiting for input of data, and 150-250 milliwatts at peak usage. The access times range from 100 to 250 nanoseconds.

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The following table shows the specifications of the 1M EPROM products on the market as well as those soon to be marketed:

	Hitachi	NEC	Fujitsu	Mitsubishi Electric	Oki	Toshiba
Organization	*64Kx16 128kx8	64Kx16	64Kx16 *128Kx8 64Kx16/ 128Kx8	*64Kx16 *128Kx8	*64Kx16	*64Kx16 *128Kx8
Process Technology	CMOS	CMOS	CMOS	CMOS	NMOS	CMOS
Design Rule (microns)	1.3	1.2	1.5	+	+	+
Access Time (nanoseconds)	150- 250	150- 250	200- 250	200- 250	100- 200	150
Power Consumption Peak Usage (milliwatts)	150	250	163	+	+	+
Stand-By (microwatts)	100	500	550	+	+	+
Program Writing Voltage	12.5	12.5	12.5	12.5	10.5 or 12.5	12.5
Program Writing Time (seconds/megabit)	120	30	120	+	+	+
Chip size (square millimeters)	6.1x7 6.92 x6.5	8.36 x7.53	7.15x7.7 7x7 6.67x6.84	6.5 x6.5	+	6.3x6.75

*Soon to be marketed
+Information not yet available

(A translation of the sources cited in this article will appear in JAPAN REPORT: SCIENCE AND TECHNOLOGY.)



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FOR OFFICIAL USE ONLY**USSR/BULGARIA: NEW JOINT VENTURE TO CO-PRODUCE MACHINING CENTERS**

Key Points: A new joint Soviet-Bulgarian science and production association, established after unusually short negotiations, began operating on 1 January 1986. Principal partners in this "promising new form of socialist integration" are the Machine-Tool Building Association in Ivanovo and the EMM Machine-Tool Building Association in Sofia. On 18 March IZVESTIYA reported that the initial lot of IS-200 machining centers, the first to be produced in Bulgaria under the new association, will be ready for shipment in April of this year. The next generation of this aggregated machining system is reportedly under development and 20 units will be delivered by year's end. Moreover, as the scope of this joint venture expands, "many thousands" of units will be marketed in the USSR, in Bulgaria, and on the world market.

The first joint Soviet-Bulgarian venture, involving Moscow's Krasnyy Proletariy machine building plant and Bulgaria's Beroye production association, was set up in 1985 to co-produce NC machine tools and a new generation of turning centers. IZVESTIYA reports that the decision to establish a second joint Soviet-Bulgarian Science and Production Association was made "at high government levels" in conjunction with the 38th anniversary of the Soviet-Bulgarian Treaty on Friendship, Cooperation, and Mutual Aid and in coordination with existing CEMA agreements on technical cooperation. Reportedly, this new inter-government agreement is an agreement in principle "which was prepared on very short order and signed immediately." The agreement allows the details of cooperation to be worked out at lower administrative levels and the engineering problems to be solved by technical specialists from both enterprises. According to the article, "while the basic questions of cooperation were being worked out, preparations were under way to set up the production of parts and components for the Ivanovo model IS-200 machining center."

According to IZVESTIYA, the first units of the IS-200 (IS stands for Ivanovo-Sofia) will be assembled and shipped from Pazardzhik, Bulgaria, in April of this year. The next generation of this machining center, the IS-500, is described as being of the highest quality, with fewer parts, and working at higher speeds and with greater accuracy. Moreover, it will be suitable for incorporation into flexible manufacturing systems. By year's end, 20 units will be ready for delivery; 10 will be shipped to the Soviet Union and 10 will remain in Bulgaria.

Furthermore, the scope of this joint venture is soon to be expanded "under a single production and trade-finance policy." According to IZVESTIYA, this means that future IS machining centers and other automated machine tools will be researched, designed, developed, produced, and distributed jointly. A leader of one of the EMM Association's design sections, K. Konyarskiy, who was involved in setting up this joint NPO, enthusiastically states in IZVESTIYA that "we will distribute the machines in our countries and on the world market. The machines will number in the thousands. Many thousands."

(A translation of the IZVESTIYA article will appear in the USSR REPORT: MACHINE TOOLS AND METALWORKING EQUIPMENT.)



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FOR OFFICIAL USE ONLY**USSR: INCREASED INTEREST IN SEABED MANGANESE NODULES**

Key Points: The number of articles in the Soviet press that relate to manganese nodules has more than doubled in the past two years. These articles indicate the areas that are of greatest concern to the Soviets — nodule physicochemical properties, nodule classification by origin and morphology, nodule variation with geographic location, nodule sound-scattering potential, and nodule-mining methods, equipment, and cost-effectiveness.

Two current Soviet books devote more than 30 percent of their content to the subject of manganese nodules. One contains four chapters on the geo-economic evaluation and classification of manganese nodules. (Reference 1) It discusses the cost-effectiveness of various methods of nodule prospecting. Another includes three chapters on the geochemical properties of manganese nodules. (Reference 2) The authors establish that the ion composition of ocean waters varies with depth and exerts an influence on the composition of nodules. They also describe the interrelationship of nodule morphology and mineral and chemical composition. I. S. Gramberg, director of the Arctic Geology Scientific Research Institute, co-authored the chapter on the physicochemical evaluation of manganese nodules to determine if their mining is worthwhile.

Similarly, the works on manganese nodules in Soviet scientific journals focus on their physicochemical composition, the ways they are classified according to differences in composition, and the methods used to distinguish them. They describe their stages of formation, as well as postsedimentary transformation. They also address distinctions which are associated with geographic locations.

The heightened interest in equipment for obtaining manganese nodules is evidenced by a Soviet article which describes a French invention that gathers and lifts the nodules. (Reference 5) Furthermore, on 1 March 1986 the Helsinki newspaper HELSINGIN SANOMAT reports on the Soviet purchase of a "sea-bottom nodule collecting craft" from the Rauma-Repola Company.

These articles do not indicate the Soviet reasons (e.g. depletion of accessible reserves or military significance of cobalt and manganese) for increased interest in this subject. It may be that they feel the potential long-term exploitation of deep-sea resources will place them in an economically and militarily advantageous position.

The major books and articles on this subject are as follows:

1. "Economic Effectiveness of Ocean and Shelf Prospecting," edited by V. L. Ivanov and published by the Northern Production Association for Marine Geological Prospecting Work.
2. "Geochemistry of Bottom Formations in the World Ocean," edited by L. I. Anikeyeva.
3. "The Mechanism of Fixation of Mn and Fe on the Surface of Ferromanganese Nodules," co-authored by A. A. Morozov of the Shirshov Oceanology Institute, DOKLADY AKADEMII NAUK SSSR (Vol 282, No 3).
4. "Genotypes of Ferromanganese Nodules in the Equatorial Part of the Pacific Ocean," published by the Southern Production Association for Marine Geological Prospecting Work (Ibid., No 4).
5. "A Self-Contained Apparatus For Collecting and Raising Ferromanganese Nodules." (July 1985 IZVESTIYA VYSSHIKH UCHEBNIKH ZAVEDENIY: GEOLOGIYA I RAZVEDKA).
6. "The Formation of Todorokite and Bernessite in Fe-Mn Nodules of the Black Sea" (July 1985 IZVESTIYA AKADEMII NAUK SSSR: SERIYA GEOLOGICHESKAYA).

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7. "Sound Scattering by Ferromanganese Nodules," co-authored by L. M. Brekhovskikh, academician secretary of the Oceanology, Atmospheric Physics, and Geography Department of the Academy of Sciences (July-August 1985 AKUSTICHESKIY ZHURNAL).
8. "Local Variations of Nodules in Clarion-Clipperton Ore Province," authored by associates of the Shirshov Oceanology Institute (July-August 1985 OKEANOLOGIYA).
9. "The Acoustic Method of Estimating Nodule Concentration on the Ocean Bottom," again from the Shirshov Institute (September-October 1985 OKEANOLOGIYA).
10. "Roentgenospectral Fluorescent Analysis of Manganese Nodules" (Ibid.).
11. "The Influence of the Biogenic Factor on the Formation of Microstructures of Deep-Water Ferromanganese Nodules" (January 1986 GEOLOGICHESKIY ZHURNAL).
12. "The Role of Biogenic Silica in the Formation of Fe-Mn Micro-Nodules" (January 1986 IZVESTIYA AKADEMII NAUK SSSR: SERIYA GEOLOGICHESKAYA).
13. "Postsedimentation Transformation of Oceanic Fe-Mn Nodules and Crusts" (Ibid.).
14. "Ocean Ore Formation," which devotes its largest section to ferromanganese nodules (March 1986 VESTNIK AKADEMII NAUK SSSR).

(Translations or abstracts of the above sources appear in the USSR REPORT: EARTH SCIENCES.)



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S&T PREVIEWS

S&T PREVIEWS is an annotated list of selected science and technology items being translated by FBIS. The list may also contain previously published items of wide consumer interest.

EUROPE REPORT: SCIENCE AND TECHNOLOGY

COMPUTERS

BULGARIAN COMPUTER INSTITUTE DIRECTOR DISCUSSES ITS ACTIVITIES

The director of the Central Institute of Computer Technology discusses the activities of the institute and some of the products it has developed. (Sofia TRUD 11 Mar 86 p 1)

BULGARIAN USE OF MICROCOMPUTERS IN ADMINISTRATIVE ACTIVITY

The article describes activities of the Central Institute for Program Products and Systems concerning automation of information systems on the basis of the "Pravets 82" microcomputer. (Sofia ELEKTROPROMISHLENOST I PRIBOROSTROENE No 1, 1986 pp 3-5)

TRACCS-11 TRANSACTION PROCESSING SYSTEM

Discussion of software and hardware architecture of transaction processing based on TPA megamini computers. (Budapest MAGYAR ELEKTRONIKA Nov 85 pp 23-28)

FACTORY AUTOMATION

OVERVIEW OF ROBOT EXPORTS/IMPORTS IN ITALY

A detailed summary of a December 1985 survey of the Italian market for industrial robots. (Milan TECNICHE DELL'AUTOMAZIONE & ROBOTICA Feb 86 pp 40-46)

ITALY'S CNR TO FINANCE R&D IN ROBOTICS

The national program, involving some 20 academic centers, will entail the expenditure of only \$3 million over the next 3 years. (Milan TECNICHE DELL'AUTOMAZIONE & ROBOTICA Feb 86 pp 34-38)

LATIN AMERICA REPORT: Brazil

SAO CARLOS, MAGNET FOR ADVANCED R&D

The High Technology Park Foundation in Sao Carlos is conducting advanced R&D under the sponsorship of industrial firms in the fields of electronic optics and ceramics. (Sao Paula DADOS E IDEAS Mar 86 pp 18-21)

USSR REPORT: CHEMISTRY

SELECTIVE SUBSTITUTION OF H ATOMS FOR F IN o,m-CARBORANES UNDER THE INFLUENCE OF THE $SbF_5 \cdot (C_2F_5)_3 N$ SYSTEM

Reactions of various F- and H-substituted carboranes, which may be important in such areas as fluorine-based rocket fuel production. (Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA KHIMICHESKAYA No 1, Jan 86 pp 253-254)

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EFFECT OF THE GRAVITATIONAL FIELD ON THE DIFFUSION KINETICS IN A CELL WITH CYLINDRICAL ELECTRODES

This study could possibly relate to developing submarine batteries. (Moscow ELEKTROKIMIYA Vol 22, No 1, Jan 86 pp 107-113)

ON THE FEASIBILITY OF NUCLEAR REACTIONS DURING FRACTURE OF SOLIDS

The possibility of initiating nuclear reactions by fracturing deuterated dielectrics is investigated. It is shown experimentally that neutrons are formed at the moment of D₂O crystal fracture. (Moscow KOLLOIDNYY ZHURNAL Vol 48, No 1, Jan-Feb 86 pp 12-14)

TRANSPLUTONIUM ELEMENTS

Four articles from the Second All-Union Conference on the Chemistry of Transplutonium Elements (Dimitrograd, 21-23 June 1983). For example, **EXTRACTION METHODS FOR THE SEPARATION AND PURIFICATION OF TRANSPLUTONIUM ELEMENTS** and **PRESENT PROBLEMS IN THE RADIOBIOLOGY OF TRANSPLUTONIUM ELEMENTS**. (Leningrad RADIOKIMIYA Vol 28, No 1, Jan-Feb 86, various pages.)

USSR REPORT: CYBERNETICS, COMPUTERS AND AUTOMATION TECHNOLOGY

ERFURT PRESSING MANUFACTURING PLANT PROFILED

The Erfurt Plant specializing in building forging presses for CEMA member countries has increased production by 400 percent since 1970 due primarily to plant automation processes. (Moscow PRAVDA 13 Mar 86 p 4)

USSR REPORT: EARTH SCIENCES

EFFECTS OF SHEAR ON INTERNAL WAVES IN THE OCEAN

This article describes the effect currents have on internal waves through gradient-vorticity forces. (Moscow OKEANOLOGIYA No 1, Jan-Feb 86 pp 40-45)

MULTIWAVE LASER SOUNDING OF ATMOSPHERIC AEROSOL: EXPERIMENTAL STUDY (REVIEW)

Technical characteristics and structural features of multiwave lidars are discussed; results of aerosol studies are presented. (Minsk ZHURNAL PRIKLADNOY SPEKTROSKOPII Vol 44, No 2, Feb 86 pp 183-196)

USSR REPORT: ENGINEERING AND EQUIPMENT

DEPUTY MINISTER VIEWS NEW TURBINE TECHNOLOGY

Deputy minister Chasnyk examines planned developments in turbine design under the 12th Five-Year Plan. Survey includes valuable technical and economic data. (Moscow ENERGO MASHINOSTROYENIYE Jan 86)

USSR REPORT: PHYSICS AND MATHEMATICS

SOVIET SOLID-STATE LASERS

An excellent overview of all Soviet-designed solid-state lasers, including GSGG:Cr³⁺ and Al₂O₃:Ti²⁺, color-center lasers and various semiconductor lasers. (Moscow USPEKHI FIZICHESKIKH NAUK Vol 146, No 1, Jan 86, pp 3-211)

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USSR REPORT: SPACE

FURTHER PRESS COMMENTARY ON 'MIR' ORBITAL STATION

Feature articles from central press on launch of new "Mir" station. Comments on internal layout of station, improved computer support for crew, references to use of a system of "special manipulators" in conjunction with the lateral docking ports. (central press 21 Feb 86)

GRISHIN ON DEVELOPMENT OF ORBITAL PRODUCTION FACILITIES

Prospects for materials processing and space manufacturing; need for development of a special technological module with a double hull design for isolation of a spherical internal vessel from gravitational perturbations; drawing shows "elements of a future orbital complex." (Moscow NTR: PROBLEMY I RESHENIYA No 2, 21 Jan-3 Feb 86 p 8)

FRENCH JOURNALIST INTERVIEWS SAGDEYEV, COMMENTS ON GLAVKOSMOS

Roald Sagdeyev, director of IKI, comments on role of the new space organization Glavkosmos. Glavkosmos will offer launch services as do the U.S. shuttle and Ariane. (Paris LIBERATION in French 6 Mar 86 pp 26-27)

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