STEKOL'NIKOV, I. S.

"An instrument for using the speed of restoration of the dielectric strength of discharge gaps", by Doctor of Technical Sciences I. S. Stekol'nikov, at the Power Engr. Inst. im KRZHIZHANOVSKIY of the Acad. Sce. USSR.

SO: Elektrichestvo, No 5, Moscow, May 1947 (U-5533)

STEKOL'NIKOV, I. S.

At the plenary meeting of the conference of the Power Establishments of the Academies of Sciences of the Union Republics and of the Affiliates of the Academy of Science, USSR, the following paper was presented by Doctor of Technical Sciences I. S. Stekol'nikov on "Powerful impulse discharges and lightning".

SO: Elektrichestvo, No. 9 Moscow, Sept. 1947 (U-5534)

STEKOL'NIKOV, I.S.

"Electronic Oscillograph." Second edition, completely revised.

Gosenergoi-dat, 1949, 146 pp, 3,500 copies.

STEKOL'NIKOV, I.S.

"Pulse Oscillography and Its Applications."
Academy of Sciences USSR Power Engineering Institute imeni Krzhizhanovskiy, Academy of Sciences USSR, 1949, 200 pp, 3,500 copies

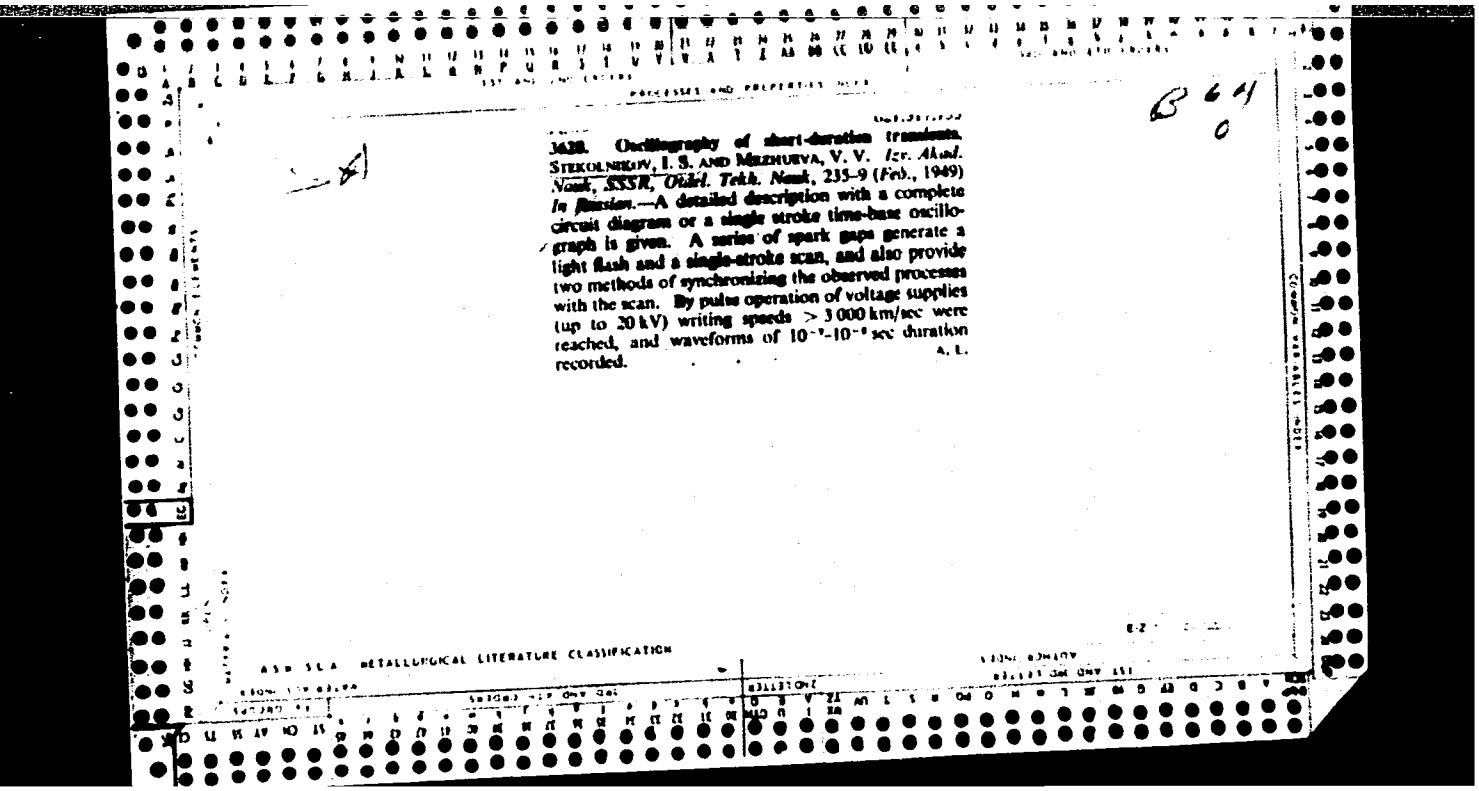
STEKL'NIKOV, I. S.

STEKOL'NIKOV, IL'YA SAMUILOVICH

Elektronnyi ostsillograf. Izd. 2., sovershenno perer. Moskva, Gos. energ. Izd-vo, 1949. 414 p., diagrs.
Bibliography: p. 410-413.
Title tr.: Cathode ray oscillograph.
Revieved by V.V. Vlasov in Sovetskaia kniga, 1951, no, 1, p, 26-28.

TK7871.C27S8 1949

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.



3438. **Oscillography of short-duration transients.** STEKOLNIKOV, I. S. AND MEZHUEVA, V. V. *Izv. Akad. Nauk, SSSR, Otdel. Tekh. Nauk*, 235–9 (*Feb.*, 1949) *In Russian.*—A detailed description with a complete circuit diagram of a single stroke time-base oscillograph is given. A series of spark gaps generate a light flash and a single-stroke scan, and also provide two methods of synchronizing the observed processes with the scan. By pulse operation of voltage supplies (up to 20 kV) writing speeds > 3 000 km/sec were reached, and waveforms of 10^{-7}–10^{-8} sec duration recorded. A. L.

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

STEKOL'NIKOV, I. S.

FA 33/49T36

USSR/Electronics Feb 49
Oscilloscopes

"Oscillographic Analysis of Pulses," I. S. Stekol'nikov, V. V. Mezhuyeva, Power Eng Inst imeni G. M. Krzhizhanovskiy, Acad Sci USSR, 5 pp

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 2

Gives schematic diagram and parts of new oscilloscope, operating with an over-voltage 5-6 times normal, and registering phenomena with durations of only 10^{-7} to 10^{-8} sec. Submitted by Acad G. M. Krzhizhanovskiy, 8 Jul 48.

33/49T36

STEKOL'NIKOV, I. S. PA 162T32

USSR/Electricity - Discharge, Electric Jul 50

"Investigation Into the Initial Stage of Discharge for Very Small Interelectrode Gaps," I. S. Stekol'nikov, Power Eng Inst imeni Krzhizhanovskiy, Acad Sci USSR

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 7, pp 985-994

Investigation of subject discharge in air or oil shows that start of discharge is caused by conducting bridges and is governed by conditions in bridges (impurities on electrode surfaces or in

162T32

USSR/Electricity - Discharge, Electric (Contd) Jul 50

liquid medium due to products of pyrolysis and erosion). Submitted 5 Apr 50 by Acad A. V. Vinter.

162T32

1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

S4

153
0

8080. Investigation of the initial stage of sparking. V. V. Mezhueva, L. S. Bogoliubov and A. Z. Ermenev. *J. Tech. Phys., USSR*, 20 (No. 3) 300-26 (1950) *In Russian.*

The results of the oscillographic investigation of sparking in widely varying conditions may be formulated thus: The character of the initial time relation $U_{sp}(t)$ remains essentially the same for diverse circuits and may approximately be represented by the expression $U_0 \exp(-at)$, where a is hardly influenced by circuit parameters, but varies very considerably between different voltage ranges. The marked increase of a in certain of these ranges leads to the conception of "energetically poor" sparks. A noteworthy retardation of the fall of $U_{sp}(t)$ is observed when I_m approaches 30 amp. Equations for determining t were derived for exponential variation of U_{sp} and by means of these the beginning of the retarded fall of U_{sp} could be forecast. The energy dissipated in the initial sparking stage was also determined theoretically as well as experimentally, with satisfactory agreement between the results. It was found that for given a this energy depends on the frequency. The problem of the theory of the initial phase of the power spark remains for the present unsolved; in particular, Toepler's law does not describe the U_{sp} relation correctly, except as a crude approximation.

N. F. KRAIN

A10.51A METALLURGICAL LITERATURE CLASSIFICATION

STEKOLNIKOV, I. S.; KOMELKOV, V. S.; BOGOMOLOV, A. F.; LIKHACHEV, F. A.; BORISOV, V. N.; LOPSHITS, L. M.

Grozozashita Promyshlennykh Sooruzhenii i Zdanii (Lightning Protection of Industrial Structures and Buildings), 202 p., Pub. House of the AS USSR, Moscow, 1951.

[redacted], I. S.

B-59 [redacted], I. S. Elektronnaya ostsillografiya kratkovremennykh protsessov (Electronic oscillography of instantaneous processes). Moscow, Gos. izd-vo tekhn.-teoret. lit-ry, 1952. 259p. DLC TK7872.C27S7; CUHF No. 203-F; [redacted] 520551.

This book discusses the physical principles involved in the investigation of instantaneous processes with an oscillograph, construction of various kinds of oscillographs, and electrical circuits used for various oscillographic problems. The book is designed for engineers, scientists, and students who are not experts in the field of radio engineering, but who use the oscillograph in their work.

1. STEKOL'NIKOV, I. S.

2. USSR (600)

4. Electric Spark

7. Investigations into the nature of the long spark. Part 1. Izv.AN SSSR Otd.tekh. nauk, no. 11, 1952.

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

STEKOL'NIKOV, I. S.

Electric Discharges

Method of registering a high-voltage discharge. Dokl. AN SSSR, 84, No. 6, 1952.

Monthly List of Russian Accessions, Library of Congress, October 1952. UNCLASSIFIED.

STEKOL'NIKOV, I.

Nuclear Sci. abs
V-8 Jan 15, 1954
Physics

Phys
(1)
2

MEASUREMENT OF THE RATE OF MOTION OF THE MAIN CHANNEL OF HIGH-VOLTAGE DISCHARGE. I. S. Stekol'nikov. Translated from Doklady Akad. Nauk S.S.S.R. 85, 1013-16(1952). 8p. (AEC-tr-1732)

A brief abstract of this report appears in Nuclear Science Abstracts as NSA 7-3815.

6/22/54

USSR/Electricity - Rupture 1 Nov 52

"Investigation of the Impulse Rupture of Gases and of the Velocity of Development of the Electron Shower," B.M. Gokhberg, I.S. Stekol'nikov and A.Z. Efendiyev; Inst of Phys Problems imeni Vavilov, Acad Sci USSR, and Pow Engr Inst imeni Krzhizhanovskiy, Acad Sci USSR

DAN SSSR, Vol 87, No 1, pp 29-32

Conclude that this velocity in air and elegas (SF_6) is an approx linear function of the ration voltage (kv/cm) to pressure (mm/Hg) and also depends on the nature of the gas. Presented by Acad A.F. Ioffe 12 Sep 52.

252T31

STEKOL'NIKOV, I.S., doktor tekhnicheskikh nauk.

[Recording instantaneous processes by means of electron beams] Zapis' kratkovremennykh protsessov elektronnym luchom. Moskva, Izd-vo Znanie, 1953. 30 p. (MLRA 6:9)
(Electron beams)

STEKOL'NIKOV, I. S., Dr.

Electric Engineering - Periodicals

Reducing the time of handling articles, Elektrichestvo No. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

1. STEKOL'NIKOV, I.S.; BAGIROV, M.A.

2. USSR (600)

4. Electric Spark

7. Investigating the nature of the long spark, Part 2, I.S. Stekol'nikov, M.A. Bagirov, Izv. AN SSSR. Otd.tekh.nauk. no. 2, 1953.

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

STEKOL'NIKOV, I.S. [author]; KAPTSEV, N.A. [reviewer].

"Electronic oscillography of processes of short duration." Izv.AN SSSR Otd. tekh.nauk no.8:1201-1205 Ag '53. (MLRA 6:8)
(Oscillograph)

STEKOL'NIKOV, I.S. doktor tekhnicheskikh nauk, professor.

Registration by means of an electron beam. Nauka i zhizn' 20 no.6:15-16 Je '53. (MLRA 6:6)
(Cathode ray oscillograph)

USSR

6.3-373 551.594.221:551.508.94

Stekol'nikov, I. S., Vysokovol'tnyi razriad i grozozashchita. [A high voltage discharge and thunderstorm protection.] *Priroda*, Moscow, 42(4):19–30, April 1953. 4 figs. DLC—A detailed study of the problem. The gradual development of the dynamics of high voltage lightning discharges and their consecutive stages—corona, leader, main channel, arc, long spark; rational application of lightning discharges in technology; effective control of their harmful effects on aviation and radio transmission as developed in various high voltage laboratories, especially in the Laboratory of High Voltage Gas Discharge of the Energy Institute of the Academy of Sciences, are described. Descriptions of new instruments and appliances such as: recorder of lightning voltage, enabling one to get information on the nature of lightning discharges; electronic oscillograph for the registration of various stages of lightning rods and their application conclude the article. *Subject Headings:* 1. Lightning discharges 2. Lightning recorders 3. Electronic oscillographs 4. Lightning rods.—*I.M.P.*

STEKOL'NIKOV, I.S., professor; KADER, Ya. M., redaktor; VIVTER, A.V., akademik, redaktor; KAZAKOVA, V.Ye., tekhnicheskiy redaktor

[Thunder and lightning] Molniia i grom. 3-e, perer. izd. Pod red. A.V.Vintera. Moskva, Voen. izd-vo Ministerstva oborony Soiuza SSR, 1954. 91 p. [Microfilm] (MLRA 8:2)
(Lightning) (Thunderstorms)

USSR/Electricity FD-1115

Card 1/1 Pub. 41-9/13

Author : Stekol'nikov, I. S., and Galaktionov, V. I., Moscow

Title : A study of the characteristics of a long spark. III. Channel stage of spark in the "rod -- rod on surface" gap.

Periodical : Izv. AN SSSR. Otd. tekh. nauk 5, 105-118, May 1954

Abstract : Presents results of systematic study of various parameters of the channel stage of a spark discharge in a "rod -- rod on plane gap from 100 to 400 cm long. Examines speed of the leader heads at the moment of their approach by using electrooptical shutter. Reveals transitional stage from leader to main channel by means of oscillograms of current which are synchronous with photos of the leaders. Photographs, diagrams, graphs. Three references.

Institution :

Submitted : April 19. 1954

APPROVED FOR RELEASE: 08/25/2000 CIA-RDP86-00513R001653120003-0"

STEKOL'NIKOV, I.S.; GALAKTIONOV, V.I.

Electric potentials in long-span cables struck by lightning and the selection of minimum distances between the supporting cable and the conducting wire. Izv. AN SSSR Otd. tekh. nauk no. 9:3-24-34 S '54. (MLRA 8:2)
(Electric lines--Overhead)(Lightning)

STEKOL'NIKOV, I. S.

USSR/Physics - Spark discharge

FD-796

Card 1/1 Pub. 146-9/21

Author : Stekol'nikov, I. S. and Bagirov, M. A.

Title : Investigation of the velocity of development of the leader of a long spark

Periodical : Zhur. eksp. i teor. fiz., 27, 189-194, Aug 1954

Abstract : Compute the dependence of the velocity of the leader of a long spark (50 - 400 cm) on damping resistance ($R_д$ = 0.74 - 100 kilo-ohms) in the spark chain, on length of discharge gap, and on degree of over-tension on it (in limits k = 1 - 2). Three references including 1 English.

Institution : Institute of Power Engineering, Acad Sci USSR

Submitted : November 24, 1953

STEKOL'NIKOV, I. S.

USSR/ Electronics - Cathode ray tubes

Card 1/1 : Pub. 22 - 22/44

Authors : Stekol'nikov, I. S.; Inkov, A. Ya.; and Chernushenko, A. M.

Title : A new feeding system for a pulse oscillograph

Periodical : Dok. AN SSSR 98/6, 969-972, October 21, 1954

Abstract : A new method for feeding cathode ray tubes of various types is described. The method consists of applying overcharged (with respect to a normal voltage of a tube), a short, almost square wave type, negative pulses to the cathodes of the tubes. The method found a great application in the cathode ray tube industry for it helped to diminish the dimensions, weight, and cost of the tubes. Four Russian references (1944-1953). Diagrams.

Institution: Power Engineering (Energetic) Institute im. G. M. Krzhanovskiy of the Acad. of Scs. of the USSR

Presented by: Academician A. V. Vinter, May 12, 1954

STEKOL'NIKOV, I. S.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Stekol'nikov, I. S. Komel'kov, V. S. Bogomolov, A. F. Likhachev, F. A. Borisov, V. M. Lopshin, L. N.	"Lighting Protection of Industrial Structures and Buildings"	Power Engineering Institue imeni G. M. Krzhizhanovskiy, Academy of Sciences USSR

SO: W-30604, 7 July 1954

STEKOL'NIKOV, I.S.; VINTER, A.V., akademik, redaktor; KLYAUS, Ye, M.; redaktor; ZEMLYAKOVA, T.A., tekhnicheskiy redaktor

[Studies in lightning protection] Izuchenie molnii i grozozashchita. Moskva, Izd-vo Akademii nauk SSSR, 1955. 158 p. (Lightning protection) (MLRA 9:4)

STEKOL'NIKOV, I. S.

USSR/Electricity - Sparking FD-2622

Card 1/1 : Pub. 41-8/21

Author : Pulavskaya, I. G. and Stekol'nikov, I. S., Moscow

Title : Investigation of the nature of a long spark. IV. The power and energy of a long spark leader

Periodical : Izv. AN SSSR, Otd. Tekh. Nauk 4, 98-109-1955

Abstract : Measures the power and energy of a leader in a discharge gap of from 1 to 5 meters, under positive and negative potentials of a bar electrode. Describes the experimental setup and methods of registration. Discusses the test results. Criticizes the conclusions and recommendations of some past researchers. Formulae, graphs, table. Four references, 3 USSR.

Institution :

Submitted : December 23, 1954

STEKOL'NIKOV, I.S. (Moskva)

Model representation of currents in the channel stage of a long spark. Izv.AN SSSR. Otd.tekh.nauk no.10:40-47 O'55.
(Electric spark) (MLRA 9:1)

STEKOL'NIKOV, Il'ya Samuilovich; BORISOV, Vladimir Nikolayevich; SMIRNOV, Il'ya Grigor'yevich; OTOCHEVA, M.A., redaktor izdatel'stva; KONYASHINA, A.D., tekhnicheskiy redaktor.

[Lightning Protection of buildings and equipment in agricultural localities] Grozozashchita zdanii i sooruzhenii v sel'skoi mestnosti. Moskva, Izd-vo M-va kommun.khoz.RSFSR, 1956. 86 p. (MLRA 10:4)

(Lightning protection)

STEKOL'NIKOV, I.S., professor, doktor tekhnicheskikh nauk.

Benjamin Franklin. Elektrichestvo no.1:75-78 Ja '56. (MLRA 9:3)

1. Energeticheskiy institut imeni Krzhizhanovskogo Akademii Nauk SSSR.

(Franklin, Benjamin, 1706-1790)

STEKOL'NIKOV, I. S. and PULAVSKAYA, I. G.

"Investigation of the Nature of a Long Spark, V," by I. S. Stekol'nikov and I. G. Pulavskaya, Moscow, Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, No 10, Oct 56, pp 64-76

This work represents the latest developments and conclusions of I. S. Stekol'nikov in his series of eight works, dating back to 1952, which deal with the properties of long sparks. The general mechanism characterizing the leading phase discharge under the conditions of slight retardation have thereby been determined.

Among other conclusions, it was found that by assuming the same type of gap, identical wave polarity, and constant overvoltage, the quantitative characteristics, expressed in relative coordinates, do not depend (or depend little) on the voltage of the gap, in the type of air gaps considered. The quantitative characteristics are determined to a significant degree by the ratio of the total voltage of the capacitor of the "GIN" pulse generator to the voltage across the gap.

Sum 1219

LEVITSKIY, M.M., inzh.; STEKOL'NIKOV, I.S., prof.

Questions pertaining to the standardization of insulation. Energetik. za rub. no.1:25-27 Ja-F '57. (MIRA 12:11)
(Electric insulators and insulation)

PA - 2153

AUTHOR STEKOL'NIKOV, I.S.

TITLE On the Volt-second Examination of a Linear Insulation (O voltsekundnykh ispytaniyakh lineynoy izolyatsii).

PERIODICAL Izvestiia Akad.Nauk SSSR, Otdel.Tekhn., 1957, Nr 1, pp 33-38 (U.S.S.R.)

Received 3/1957 Reviewed 4/1957

ABSTRACT

Conditions for the carrying out of volt-second-examinations in the laboratory, which are equivalent to an insulation-work under the conditions of a field as well as the standardization (normalization) of the conditions for the carrying out of volt-second-examinations of insulation are dealt with. One of the phenomena which complicate the analysis of volt-seconds (V/s) characteristics and their normalization is the distortion of the shape of the voltage wave during the forming of the discharge. TOROK's opinion concerning this distortion by the streamer current was correct, only the influence of this phenomenon on the time of discharge remained unclear. Investigations of the long spark showed that the developing impulse discharge is unseparably connected with the work of the generator of the impulse-voltages (GIS) and the parameters of its discharge circuit. Conditions were established which are necessary to compare the V/s characteristics of various isolation-intermediate degrees with one another. Furthermore, the adaptation of insulation under the conditions of electricity transmission-lines is realized. In order that the work of linear insulation in the case of a reduction of the V/s characteristics and the work of this insulation at the conditions of the line be

Card 1/2

On the Volt-second Examination of a Linear Insulation.

adequate, two conditions would have to be satisfied, one of which, however, practically cannot be satisfied since it has too high values of C_0 (a parameter of the discharge-circle). It is, however, shown that it is possible, on the strength of the experimental material, to obtain realizable conditions for the experiment if one of these conditions is satisfied by approximation. Finally, an approximated method is given in order to estimate the errors which occur in the V/s characteristics. (7 illustrations)

ASSOCIATION Not given
PRESENTED BY
SUBMITTED 15. 2. 1956
AVAILABLE Library of Congress.

Card 2/2

SOLOD'NIKOV, I.S. (Moskva).

Mechanism of high-voltage discharges at industrial frequencies.
Izv. AN SSSR. Otd. tekh. nauk no.3:189-190 Mr '57. (MLRA 10:6)
(Electric discharges in gases)

24-5-21/25

AUTHOR: Stekol'nikov, I. S. (Moscow).

TITLE: Gradients in the canal of a long spark. (Prodol'nye gradiyenty kanala dlinnoy iskry).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk", (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.5, pp.133-136 (U.S.S.R.)

ABSTRACT: Recent work of the author (1) and of Norinder, H. and Salka, O. (2) indicates that three areas exist in the leader discharge in long gaps: the canal, branchings and corona. In the case of a positive rod-rod on a plane gap, Fig.1, the leader develops from both electrodes (3) and the above mentioned three areas exist both at the positive and negative leaders. It is important to determine the voltages in the area between the branches of the leader discharges which depend on the gradients in the canals and in the branchings and from this point of view it is important to determine the magnitude of the longitudinal gradients; in this paper certain results are described which were obtained with an improved technique. The experimental set-up is shown diagrammatically in Fig.1 and the obtained results are summarised in Table 1, p.134. The results have shown that the gradients in the canal of a long spark depend on

Card 1/2

Gradients in the canal of a long spark. (Cont.) 24-5-21/25

the stage of the discharge and on the instantaneous value of the current intensity, i.e. the magnitude of the gradient depends on the location in the canal and the time from the initial instant of the discharge.

There are 3 figures and 4 references, 3 of which are Slavic.

SUBMITTED: December 18, 1956.

AVAILABLE:

Card 2/2

AUTHOR: Stekol'nikov, I. S. (Moscow). 24-7-24/28

TITLE: Leader discharge current as a criterion of the effectiveness of utilisation of insulation. (Lidernyy tok kak kriteriy effektivnosti ispol'zovaniya izolyatsii).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.7, pp.150-152 (U.S.S.R.)

ABSTRACT: In earlier work of the author (1-3) it was established that during the development of an impulse discharge in various types of gaps a leader current flows in the circuit which is a variable function of time. On the basis of earlier results it can be concluded that the leader current is a criterion of the imperfection of the insulation gap; the more uniform the field the shorter the relative duration of the leader current. This criterion enables evaluation of the operation of metering spheres which are widely used in high voltage engineering for determining maximum surge voltage values. To analyse in greater detail the dependence of the leader current on the character of the electric field, experiments were carried out in which the discharge was effected between standard 25 cm dia. spherical electrodes held in a horizontal position on a

1/2

Leader discharge current as a criterion of the effectiveness of utilisation of insulation. (Cont.) 24-7-24/28

stand with moveable columns. Variation of the uniformity of the field was effected by varying the gap width. It was established that with increasing non-uniformity of the field in the discharge gap, the relative duration of the leader process increases and also its role in the formation of the discharge, thus confirming the above mentioned criterion. It follows from the obtained oscillograms that leader current which impedes the development of a discharge and delays the discharge will appear for a gap which is near to the size of the radius of the sphere; this also explains the increase in the scattering of the measured values when using a discharge gap between two spheres with the gap width larger than the sphere radius. There are 4 figures and 3 references, all of which are Slavic.

2/2

SUBMITTED: November 26, 1956.

AVAILABLE:

STEKOL'NIKOV, I. S.

24-8-19/34

AUTHOR: Stekol'nikov, I. S. (Moscow).

TITLE: Increase in the electrical strength of the discharge gap for industrial frequency voltages. (Effekt uprochneniya razryadnogo promezhutka na napryazhenii promyshlennoy chastoty).

PERIODICAL: "Izvestiya Akademii Nauk,Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.8, pp.129-130 (U.S.S.R.)

ABSTRACT: In studying the mechanism of discharge and the conditions of flashover of long gaps at voltages of industrial frequency the phenomenon of a strengthening of the discharge gap was observed. Some of the results obtained during these investigations are described in this paper. The test circuit, as shown in Fig.1, p.129, consists of a transformer which feeds a discharge gap which is in series with a resistance; parallel to the discharge gap a circuit consisting of a capacitor in series with a resistance is connected, the time constant of which is sufficiently small compared to a 50 cycle half period. The oscillogram indicates that during the discharge the electric strength of the gap tends to increase. The published material is of interest in analysing conditions of operation of the insulation in test

Card 1/2

Increase in the electrical strength of the discharge gap of industrial frequency voltages. (Cont.)

stands and power circuits, the circuit diagram of which can be reduced to that shown in the previously mentioned Fig.1. The mechanism bringing about an increase in the electrical strength of the gap after breakdown is not considered.
There are 2 figures and 2 references, one of which is Slavic.

SUBMITTED: April 30, 1957.

AVAILABLE: Library of Congress

Card 2/2

PA - 3094

AUTHOR: STEKOL'NIKOV, I.S. (Moscow)

TITLE: The Phenomena of a High Tension Discharge with Voltage of Industrial Frequency. (Mekhanizm vysokovol'tnogo razryada pri napryazhenii promyshlennoy chastoty, Russian).

PERIODICAL: Izvestiia Akad. Nauk SSSR, 1957, Vol 21, Nr 3, pp 189 - 190 (U.S.S.R.)

Received: 6 / 1957 Reviewed: 7 / 1957

ABSTRACT: Some results of experiments in the Laboratory for High Tension Discharge of the ENIN AN SSSR are given. In order to be able to investigate the optical appearances with the development of the discharge in the course of several minutes with sufficient resolving property after the time a special camera was constructed in which the drum with the film realized a spiral motion. The objective gave as a result a picture on the drum which could be registered on a band of about 7,5 m in length. With the unchanged distance S_o, the capacity C_o (attached to the electrode), the damping resistance R_B and the protective Resistance R_z were varied. The discharge developped in the following manner. First appeared the well-known corona. This corona developped into a streamer corona. Then the "flares" and "impulse stage" were observed. The flares are shining columns which stretch over the discharge area. They consist of thin pale threads analogous to those of the conductive part of the

Card 1/2

PA - 3094

The Phenomena of a High Tension Discharge with Voltage of Industrial Frequency.

corona under impulse voltage. The impulse stage consists of a conductive part and a main channel. The peculiarities of this appearance were investigated during discharges under impulse voltage. These stages follow those with the flares. Two discharges which were photographed with the spiral form and quick camera were described. The question of whether the described discharge structure remains the same for greater variations of R_B and C_o must still be looked into.
(1 illustrations and citation from a Slav publication)

ASSOCIATION: Not given.
PRESENTED BY:
SUBMITTED: 27.12.1956
AVAILABLE: Library of Congress

Card 2/2

STEKOL'NIKOV, I. S.

"First Stages of Spark Development."

paper presented at Second All-Union Conference on Gaseous Electronics, Moscow, 2-6 Oct '58.

SOV/24-58-4-31/39

AUTHORS: Brago, Ye. N. and Stekol'nikov, I. S. (Moscow)

TITLE: On the Structure of a Long Spark in the case of Surge Voltages (O strukture dlinnoy iskry pri impul'snom napryazhenii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 4, pp 146-147 (USSR)

ABSTRACT: By means of an instrument, the design of which is based on an electron-optic transducer and a 2-beam oscillograph with a very fast time scanning, the possibility was provided for studying the details of the optical and the electric phenomena of the development of a surge discharge in long gaps. A system was devised of synchronizing the instant of switching on the instrument relative to the instant of development of the discharge, which enabled recording at high scanning speeds the various stages of the discharge, i.e. the corona, leader, canal, spark-arc and the arc stages of the discharge. Figs 1 and 2 show photographs of time scanned pictures of discharges in gaps rod (+)-rod on a plane (-) for a 130 cm long gap; the same graph also shows an oscillogram of the

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On the Structure of a Long Spark in the case of Surge Voltages

discharge current. The time scanning of the image of the discharge began at the instant t_o when the length of the leader reached 113 cm (in view of the inadequate sensitivity of the apparatus the surge corona and the corona of the leader do not appear on the photograph; later the authors did manage to make a photo of the corona). From the instant t_o the lengthening leader canal was scanned until its head came into contact with the plane. There a vertical band of illumination is visible which indicates a stepwise development of the leader canal. It is necessary to point out that on a number of other photographs the vertical components of the illumination were encountered only in the part of the leader which emitted light. From the time when the head of the canal of the leader comes into contact with the plane P_1 (Fig 1a) up to the instant t_b seven more or less clearly pronounced bright bands appear which are separated by dark intervals extending throughout the entire gap. The time interval $t_a - t_b = 15.3 \times 10^{-8}$. After the instant t_b there is a

On the Structure of a Long Spark in the case of Surge Voltages

long pause which is followed by a bright final light component at the instant t_c (see Fig 1a). The oscillogram of the current obtained for such a discharge indicates that the leader current O-a corresponds to the time interval t_a-t_b. Thus, contrary to the prevailing conception on a main canal of a long spark being a continuous process, it was found that this stage has a very complicated optical structure. As can be seen from Fig 1B, the oscillogram of the current does not contain changes in the current intensity which correspond to the light components. This can be explained either by the specific conditions of measuring the current between the 2 planes P_1 and P_2, Fig 1a, which have a relatively large mutual capacitance or by the absence of any relation between the light components and the longitudinal current flow in the spark canal. In Fig 2 the time scanning began at the instant when the length of the leader from the lower rod reached 33.3 cm and the length of the leader of the upper electrode reached 46.5 cm. The fusion of the leaders occurred at the instant t_a and in the fusion spot a bright emission of light occurred with a vertical-layer structure. The layers extend upwards and downwards to the

On the Structure of a Long Spark in the case of Surge Voltages

electrodes. After a short pause there was a very intensive component of light t_b with a sharp edge at the right side. Here the illumination weakened considerably but after 7.3×10^{-2} μsec a new bright illumination component occurs. Then, the illumination has a diffusion character up to the very end of the discharge. Analysis of the oscillogram of the current flow showed that even here the canal stage, which sets in after the instant t_a, has a complicated structure. In view of the fact that the current was measured in the lower rod, a better coordination was obtained between the picture of the changes in the current and the picture of the components of light. There are 2 figures.

(Note: This is a complete translation)

SUBMITTED: October 9, 1957

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SOV/24-58-5-29/31

AUTHORS: Pulavskaya, I. G. and Stekol'nikov, I. S. (Moscow)

TITLE: Simple Method of Conversion Calculation of Volt-Second Characteristics (Prostoy metod perescheta vol'tsekundnykh kharakteristik)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 5, pp 142-143 (USSR)

ABSTRACT: A simple method is described which, with a minimum of calculation, permits obtaining Volt-second characteristics for waves with amplitudes not entirely chopped off (as shown in Fig 1a) from Volt-second characteristics measured for waves with a standard characteristic. This method is based on the assumption that the changes in the discharge gap during the time t_2 (see Fig 1), i.e. the time until the instant of chopping of the wave, consist primarily in reducing the length of the discharge gap by the magnitude l_2, i.e. by the length of the leader discharge at the instant t_2. In this case the process of the development of the discharge can be sub-divided into two stages: the first consisting of the development of a discharge in the given gap with a standard wave and an amplitude U_1; the second the development of the

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Simple Method of Conversion Calculation of Volt-Second Characteristics

discharge in the reduced gap with a standard wave shape and a voltage U_2. The validity of this assumption can be verified by the known approximate evaluation of the growing of the leader discharge as being represented by the movement of a metallic rod into the gap. Calculations carried out for a wave reproduced in Fig.1a have shown that the difference between the Volt-second characteristics obtained by the conversion calculations differ by no more than 1.5% than for those determined experimentally and only in one point did this difference amount to 8.7%. There are 3 figures and 3 references, 2 of which are Soviet, 1 English.

SUBMITTED: January 8, 1958

AUTHOR: Stekol'nikov, I. S. (Moscow) SOV/24-58-8-34/37

TITLE: Photographic Scanning of the Impulse Stage of a Direct Current Discharge (Fotorazvertka impul'snoy stadii razryada na postoyannom napryazhenii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 8, p 158 (USSR)

ABSTRACT: In earlier work (Ref 1) the author detected in discharges in long gaps at industrial frequency an impulse stage consisting of a leader and of a main discharge and, therefore, he considered it of interest to elucidate whether the same phenomenon also occurs in the case of a direct current discharge. In spite of the fact that it has been known for some time that lightning, which develops in the case of a quasi-stationary electric field between the clouds and the Earth, contains an impulse stage, the possible assumption that such a stage will also exist in gaps fed by a d.c. voltage under laboratory conditions required experimental verification. For this purpose a discharge was photographed by means of a camera with a quartz objective lens and a time scanning with a resolution power of about 10 μsec/mm

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Photographic Scanning of the Impulse Stage of a Direct Current Discharge

which developed in a gap rod-plate of a length of 37 cm (Fig.1) for h = 27.5 cm and various braking resistances. The photographs were obtained by the following method: by regulating the voltage of the transformer T, a continuous rise of the voltage was achieved across the discharge gap S_g; the average speed of voltage increase was 2 to 3 kV/sec. The breakdown occurred at about 180 kV. 2 to 3 secs before the breakdown the shutter was opened and was shut 1 sec after the breakdown. By means of this method the photographic plate is illuminated by corona and by incomplete leader phenomena which make it impossible to reveal the impulse stage of the discharge. This difficulty was overcome by means of an appropriate light filter placed in front of the objective lens. In Fig.2 a photograph is given of the development of the spark and on this the impulse stage can be seen which consists of a leader and a main discharge canal. The time interval between the beginning of the formation of the leader discharge and the instant of forming of the main canal is approximately 10μ secs.

 The reproduced photograph was obtained with a braking

Photographic Scanning of the Impulse Stage of a Direct Current Discharge

resistance R_T = 150 kOhm and circuit parameters as shown in the graph, Fig.1. Variation of R_T within the limits of 25 to 250 kOhm have shown that the time of development of the leader discharge decreases with decreasing R_T. Thus, it was confirmed that a spark inside a gap with a non-uniform d.c. field will also contain an impulse stage.
There are 2 figures and 1 Soviet reference.
(Note: This is a complete translation with the exception of the figure captions)

SUBMITTED: January 11, 1958

1. Electric discharges--Photographic analysis

SOV/30-58-10-12/53

AUTHORS: Inkov, A. Ya., Stekol'nikov, I. S., Doctor of Technical Sciences

TITLE: Electron Oscillograph (Elektronnyy ostsillograf)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 10, pp 67-70 (USSR)

ABSTRACT: In the laboratoriya vysokovol'tnogo gazovogo razryada Energeticheskogo instituta im. G. M. Krzhizhanovskogo Akademii nauk SSSR (Laboratory for High-Voltage Gas Discharge of the Institute of Energetics imeni G. M. Krzhizhanovskiy of the AS USSR) a portable oscillograph was developed (Fig 1). It has a time resolving property of 5.10^{-10} sec/mm and is intended for investigations of short-time electric processes in high-voltage engineering. Its measurements are: length: 580 mm; height: 450 mm; width: 270 mm; weight: 21,5 kg. It is fed with 220-V current from the electric-supply line and has a maximum power absorption of 200 W. The high-vacuum and high-voltage valves presently produced by Soviet industry permit a recording speed of more than 100 000 km/sec. The electric scheme of this oscillograph is shown in figure 2 and subsequently described in detail. The electron oscillograph is of greatest importance for

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modern measuring techniques. There are 2 figures.

SOV/24-58-11-13/42

AUTHORS: Brago, Ye. N. and Stekol'nikov, I. S. (Moscow)

TITLE: Investigation of the Nature of a Long Spark (Issledovaniye prirody dlinnoy iskry)
Part VI. Pre-leader Phenomena of a Surge Discharge (Dolidernyye yavleniya impul'snogo razryada)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 11, pp 50-58 (USSR)

ABSTRACT: In earlier work of the authors (Refs 1-8) problems were dealt with relating to the development of surge corona, certain assumptions were made and various hypotheses on the mechanism of the development of such corona were put forward. In the here described work the authors filmed the optical picture and simultaneously recorded the current and voltage so as to obtain quantitative data on the mechanism of surge corona in long gaps. Furthermore, they aimed at elucidating the effect on the development of impulse corona of such external factors as introducing a screen into the gap, configuration of the external electrostatic field, repetition frequency, etc., as well as the interaction of these factors with the subsequent stages of the discharge. The corona studies were carried

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out in plane + sphere gaps of 100, 150, 200 and 265 cm length; the diameters of the spheres with corona discharges were 4.7, 15, 25 cm. As a voltage source a surge generator with a nominal voltage of 3.5 MV and a discharge capacitance of 18 200 pF was used. The voltage and the current of the corona were recorded by means of a circuit shown in Fig.1 in which the corona emitting electrode plus the sphere were grounded and the other electrode, a plane of 3 x 3 m^2, was placed on the top at a height of 490 cm from the floor level of the high voltage hall. The results of the photographic corona investigations in gaps up to 265 cm long are in agreement with earlier obtained results for shorter gaps; the corona consists of individual elements each of which can be clearly sub-divided into two parts: rectilinear discharges emitting a bright light and emanating directly from the sphere, and long tree-like threads emitting a weak light. In Fig.3 the dependence is graphed of the length of surge corona (determined from the photographs) on the amplitude of the voltage impulse for a sphere diameter of 25 cm. Photographs reproduced in Fig.4 show the influence

Investigation of the Nature of a Long Spark

of screens on the development of surge corona; it was found that the breakdown of a barrier placed into the discharge gap proceeds during the corona stage, which is not in agreement with the results obtained by Norinder and Salka (Ref 9). The data obtained for the ignition potential of the corona differ from those obtained in earlier work of the authors (Ref 5) which related to measuring the corona threshold voltage in sphere-plane gaps up to 150 cm long. This difference is attributed to a differing distribution of the external electrical field in the case of an "upside down" arrangement with a sphere at ground potential. In Fig.5 the dependence is graphed of the time t (μsec) and the voltage U_m (kV) of surge corona on the steepness h of the applied voltage impulse (sphere of 4.7 cm dia). In Fig.6 the dependence is graphed of the amplitude of the current of the surge corona i(a) on the ignition potential U (kV) for a sphere of the same diameter. Park and Cones (Ref 7) pointed out that the striking of corona is appreciably influenced by the preliminary syphoning of free electrons from the discharge gap. The here described experiments

have shown that these results are correct only for the conditions pertaining in the experiments of the authors, i.e. relatively short gaps and voltages approaching U_o. Such results could not be reproduced under similar conditions in gaps 100 to 265 cm long. In Fig.7 oscillograms and photographs are reproduced which indicate the relation between the structure of the corona elements and the shape of current surges. It is characteristic that the current of two corona elements (Fig.7B) is twice as intensive as that of a single element; the current impulse of two corona elements is exactly equal to the sum of two impulses from a single corona element. It was found that the corona current does not change by placing a screen into the discharge gap (Fig.4a) and also that the ionisation density in the column of a corona element exceeds 5.7×10^{12} ions/cm^3. In the last part

Investigation of the Nature of a Long Spark SOV/24-58-11-13/42

of the paper the obtained results are evaluated in detail. There are 8 figures and 11 references, 6 of which are Soviet, 4 English, 1 German.

SUBMITTED: December 14, 1957

Card 5/5

SHCHERBAKOVA, N.A., studentka; STEKOL'NIKOV, I.S., prof., doktor

Model study of the channel stage current in a long spark. Izv. TPI 95:72-79 '58. (MIRA 14:9)
(Electric spark--Electromechanical analogies)

SHKILEV, A.V., student; STEKOL'NIKOV, I.S., prof., doktor.

Using a photomultiplier in studying long sparks. Izv. TPI 95: 80-87 '58. (MIRA 14:9)
(Photoelectric multipliers) (Electric spark)

NAZAROVA, K.S., studentka; STEKOL'NIKOV, I.S., prof., doktor

Investigation of gradients in a leader channel. Izv. TPI 95: 88-91 '58. (MIRA 14:9)
(Electric spark) (Dielectrics)

STEKOL'NIKOV, I.S.

14(6),8(0) PHASE I BOOK EXPLOITATION SOV/3071

Akademiya nauk SSSR. Energeticheskiy institut

Elektroenergetika, vyp. 1 (Electric Power Engineering, Nr 1) Moscow, Izd-vo AN SSSR, 1959. 159 p. Errata slip inserted. 2,800 copies printed.

Eds. of Publishing House: P. P. Ogarkov and Ye. M. Grigor'yev; Tech. Ed.: Ye. V. Zelenkova; Editorial Board: Yu. G. Tolstov, Doctor of Technical Sciences (Resp. Ed.), I. M. Markovich, Doctor of Technical Sciences, I. S. Stekol'nikov, Doctor of Technical Sciences, P. I. Zubkov, Candidate of Technical Sciences, V. I. Levitov, G. V. Nikhmevich, Candidate of Technical Sciences, V. I. Levitov, Candidate of Technical Sciences, and M. D. Bol'shov (Secretary)

PURPOSE: This collection of articles is intended for specialists in the various fields of electric power engineering treated in it.

COVERAGE: The first issue of the collection of articles, Elektroenergetika, appeared in April 1959. It is published by ENIN imeni G. M. Krzhizhanovskiy of the Academy of Sciences, USSR. The articles in this issue are based on research and work by the authors under the auspices of ENIN. The articles are on a high theoretical and technical level and represent original contributions to various present-day problems in electrical engineering. References are given after most of the articles.

STEKOL'NIKOV, I.S.

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24.2.130 SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, G.V. and Sirotenko, I.G.

TITLE: Report on the Second All-Union Conference on Gas Electronics

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organised by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University. It was opened by the chairman of the organising committee, M.A. Leontovich, Academician. During the plenary sessions of the conference, a number of survey papers were delivered. L.A. Artsimovich read a paper on "Production of Ultra-high Temperatures in Plasma".
A survey of the optical method of measurements was given in the papers by V.A. Fabrikant and S.E. Frish.
S. Brown of the Massachusetts Institute of Technology gave a survey of the high-frequency methods of the investigation of stationary and non-stationary plasma (see p 1344 in this issue of the journal).
N.V. Fedorenko read a paper entitled "Ionisation and Inelastic Scattering During Atomic Collisions".

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L.A. Sena and Yu.M. Kagan dealt with "Elementary Processes of Determining the Motion of Ions in Gas".
A paper by Ye. Badareu (Rumania) dealt with "The Role of Resonance--Recharging in the Kinetics of Ions".
I.S. Stekol'nikov considered the initial stages of the development of sparks (corona-leader, main channel and the final channel).
B.N. Klyarfeld gave a survey of the ignition processes of the discharges in highly rarified gases.
The mechanism of the breakdown of a high-vacuum gap was elucidated in a paper by V.L. Granovskiy.
L. Tonks (USA) expounded a theory of the motion of electrons in a magnetic trap (see p 1316 of this journal).
Academician R. Rompe (Eastern Germany) described a number of experiments on non-stationary plasma conducted by himself.
M. Steenbeck (Eastern Germany) gave a generalised theory of plasma. The conference was divided into six sections.
The first section was presided over by L.A. Sena and was concerned with the elementary processes in gas discharges.
The following papers were read in this section:
Ya.M. Fogel'- "Transformation of Positive Ions Into Negative Ones in Rarified Gases".
Ya. M. Fogel' with V.A. Ankudinov and D.V. Filipenko - "Capture and Loss of Electrons During the Collision of Fast Atoms of Carbon and Hydrogen with the Molecules of Gases".
N.V. Fedorenko et al. - "Dissociation of Molecular Ions of Hydrogen During Collisions in Gas".
I.P. Flaks and Yu.S. Sigov'yev - "Capture Cross-sections of Electrons in Multicharge Ions in Inert Gases".
E.M. Kushnir et al. - "Experimental Investigation of the Resonance Recharging in Certain Single-atom Gases and Metal Vapours".
O.B. Firsov - "Qualitative Investigation of Inelastic Collisions of Atoms".
L.M. Volkova - "Effective Excitation Cross-sections of the Spectral Lines of Potassium and Argon".

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I.P. Zapesochnyy and S.M. Kishko "Some Results of the Investigation of the Optical Functions of the Excitation Bands of a Negative System".
A.A. Korchagin and A.G. Vlasov - "Investigation of the Scattering of the Electrons in a Betatron Chamber".
The second section was presided over by B.N. Klyarfel'd and was devoted to the problems of the electrical breakdown in rarified gases and in high vacuum. The following papers were read in this section:
G.Ye. Makar-Limanov and Yu.A. Nefedkiy - "Electrostatic Control of the Ignition of Glow-discharge Tubes" (see p 1274 of the journal).
S.V. Pitsyn et al. were concerned with the breakdown in a high-voltage mercury rectifier (see p 1270 of the journal).
L.G. Guseva "Ignition of the Discharge in Non-uniform Fields at Low Gas Pressures" (see p 1260 of the journal).
A.S. Soboleva and D.N. Klyarfel'd - "The Discharge Phenomena Between a Point and a Plane at Gas Pressure of 10^{-3} - 1 mm Hg".

STEKOL'NIKOV, I.S.

66702

24.2120 SOV/109-4-8-22/35

AUTHORS: Granovskiy, V.L., Luk'yanov, S.Yu., Spivak, G.V. and Sirotenko, I.G.

TITLE: Report on the Second All-Union Conference on Gas Electronics

PERIODICAL: Radiotekhnika i elektronika, 1959, Vol 4, Nr 8, pp 1339 - 1358 (USSR)

ABSTRACT: The conference was organized by the Ac.Sc.USSR, the Ministry of Higher Education and Moscow State University. T.B. Fogel'son - "Methods of Reducing the Energy Lost in the Formation of a Breakdown".
L.I. Pivovar and V.I. Gordiyenko - "Microdischarges and pre-breakdown Currents Between Metal Electrodes in High Vacuum".
V.A. Simonov and G.P. Ketukov - "Investigation of the Processes of Initiation and Development of a High-voltage Discharge in Vacuum". G.V. Smirnitskaya - "The Character-istics of Ignition in High-vacuum in Magnetic Fields".
E.M. Reykhrudel and G.V. Smirnitskaya - "The Character-istics of Ignition in High-vacuum in Magnetic Fields".
L.V. Tarasova et al. dealt with the transfer of the electrode material during the pre-breakdown stage in vacuum.
N.B. Kolomiychenko - "The Motion of Micro-particles of Substances During Electric Breakdown in Vacuum".
The third section dealt with the problems of electric sparks, corona and their practical applications. It was presided over by I.S. Stekol'nikov. The following papers were read:
V.I. Lantsov et al. - "Probe Investigation of the a.c. Corona Fields".
G.N. Aleksandrov - "Elementary Processes in the Ionisation Zone of Corona-type Conductors at Atmospheric Pressures".
Yu.A. Buzhinskiy - "Appearance of a Corona Discharge in Hydrogen and Nitrogen"
P.N. Chistyakov et al. - "Some Properties of the Corona Discharge in Hydrogen in Coaxial, Cylindrical Systems".
A.S. Sobolevs and B.N. Klyarfeld - "Appearance of Discharge Phenomena Between a Point and a Plane at Gas Pressures of 10^{-5} - 1.0 mm Hg".
Ya.Yu. Boyat et al. - "Methods of Unipolar Ionisation of Air By Means of Aero-ionisers (see p 1335 of the Journal).
M.P. Yanyukov et al. - "Time Spectra of the Radiation of a Spark Discharge in Inert Gases" (see p 1284 of the Journal).
M.P. Yanyukov and A.A. Mik - "Production of High Temperatures by Means of Spark Discharges".
V.A. Fertikhin - "Influence of the Dividing Surface of Two Media in the Electric Discharge on the Study of Long Sparks".
I.S. Stekol'nikov - "New Data From the Study of Long Sparks".
M.F. Synayev - "Properties of the Breakdown of Compressed Air in a Comparatively Uniform Field in the Presence of Localised Non-uniformities".
A.A. Vorob'yev et al. - "Pulse and Oscillographic Techniques for the Measurement of the Discharge Lags in Dielectrics" (see p 1237 of the Journal).
I.G. Nakonechnyy and A.A. Lebed - "The Nature of the Current Interruption During the Electric Explosion of a Metal Wire".
V.A. Simonov - "Propagation of Plasma From Local Pulse Sources".
G.G. Timofeyev et al. - "Observation of an Electro-magnetically Compressed Arc By Means of an Electron-optical Converter".
M.S. Ioffe and Ya.Ye. Krasnov - "Investigation of the Radial Electric Field in an Ion Magnetron".
Yu.A. Bakayev and M.K. Romanovskiy - "Experiments with an Electron Model of a System With Magnetic Samples".
A.M. Andrianov et al. - "Distribution of Magnetic and Electric Fields in Powerful Pulse Discharges".
D.M. Harding (England) - "Spectroscopic Determination of the Plasma Temperature in the "Zeta" Equipment" (see p 1326 of the Journal).
The paper by Harding aroused a lot of interest and Academician L.A. Artsimovich expressed the opinion that the electrons and ion temperatures in the "Zeta" should be of the same order; in reply to Harding, the electron temperature [illegible] that of the [illegible]

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24(3) SOV/48-23-8-10/25

AUTHOR: Stekol'nikov, I. S.

TITLE: Some New Results of the Investigation of Long Sparks

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 8, pp 975-979 (USSR)

ABSTRACT: This article discusses results obtained from experiments on spark discharge over a distance of from 1 to 5 m under various conditions. These experiments were made by Ye. N. Brago, A. Ya. Inkov, I. G. Pulavskaya, G. I. Smirnova, and the author. Optical and electrical methods were used for an investigation of the discharge corona. The corona is divided into two different parts. The first part consists of a bright straight column, the second is of faint shining and possesses woodlike structure. Figure 1 presents a scheme of the components of a corona and its development in the course of time. The diagram of figure 2 represents the length of the corona components in dependence on voltage amplitudes. The effect of the size of discharge poles is then discussed. Further, a relation between the current characteristic and the structure of the corona was found. Experiments on the avalanche-like shape and the pulse

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shape of the corona are described. The last part of the present paper deals with discharge in the leader (lider) phase and the influence exercised by the parameters of the experimental arrangement on the development of leader processes. The potential gradient of 0.3 to 0.5 kv/cm in the leader channel was determined by a special search method. There are 5 figures and 5 references, 4 of which are Soviet.

ASSOCIATION: Laboratoriya vysokovol'tnogo gazovogo razryada Energeticheskogo instituta Akademii nauk SSSR (Laboratory for High-voltage Gas Discharges of the Institute of Power Engineering of the Academy of Sciences, USSR)

PHASE I BOOK EXPLOITATION SOV/4773

Stekol'nikov, Il'ya Samuilovich

Priroda dlinnoy iskry (Characteristics of the Long Spark) Moscow, Izd-vo AN SSSR, 1960. 271 p. Errata slip inserted. 4,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Energeticheskiy institut imeni G.M. Krzhizhanovskogo.

Resp. Ed.: B.M. Vul, Corresponding Member, Academy of Sciences USSR; Ed. of Publishing House: B.V. Mints; Tech. Ed.: G.A. Astaf'yeva.

PURPOSE: This book is intended for readers studying high-voltage discharge and the utilization of its properties in scientific research and engineering.

COVERAGE: The author examines the mechanism of a spark in long gaps of various types with the application of voltages of different characteristics. The book is based on investigations carried out by the author and his coworkers and on a considerable number of published reports of other researchers. Included is information on apparatus, measurement schemes, and methods used in the study of spark characteristics. The consecutive stages of a spark in various discharge gaps (mainly in air gaps) and for various types of voltages

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are considered. On the basis of generalized representations of the development of impulse discharges, problems having important practical significance are considered. Methods of calculation are discussed and experimental methods for determining the voltage-time characteristics of insulations are reviewed. The author also recommends measures for increasing accuracy. Modern theories on the formation of lightning are presented together with recently published experimental results on this subject. A brief treatment of the theory of the development of the avalanche-streamer mechanism and its modifications is also given. Chapter II was written in collaboration with Ye.N. Brago; Chapters III and VI were written with the assistance of I.G. Pulavskaya. A.Ya. Inkov assisted the author in preparing the book for publication. References accompany each chapter. There are 288 references: 155 Soviet, 80 English, 47 German, 4 French, 1 Swedish, and 1 Latin.

TABLE OF CONTENTS:

SARKISOV, G.A.(Moskva); SMIRNOVA, G.I.(Moskva); STEKOL'NIKOV, I.S.(Moskva)

Processes in the development of the strengthening effect in an arced-over gap with voltage of commercial frequency. Izv. AN SSSR. Otd.tekh.nauk. Energ. i avtom. no.5:44-50 S-O '60. (MIRA 13:11)

1. Laboratoriya vysokovol'tnogo gazovogo razryada Energeticheskogo instituta AN SSSR.
(Electric arc) (Electrodes)

STEKOL'NIKOV, I.S. (Moskva), SHISTER, A.R. (Moskva), SHKILEV, A.V., (Moskva)

Calculation of induced overvoltages in electric power transmission lines. Izv. AN SSSR. Otd. tekh. nauk. Energ. i avtom. no.6:23-27 N-D '60. (MIRA 13:12)
(Electric lines--Overhead) (Lightning protection)

STEKOL'NIKOV, I. S.

9.8150

S/020/60/133/03/02/013
B019/B056 82273

AUTHORS: Bazelyan, E. M., Brago, Ye. N., Stekol'nikov, I. S.

TITLE: A Considerable Decrease of the Average Breakdown Gradients in Long Discharge Gaps With an Oblique-angled Voltage Wave

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 3, pp. 550 - 553

TEXT: The introduction refers to experiments carried out at the laboratoriya vysokovol'tnogo gazovogo razryada (Laboratory of High-voltage Gas Discharges) of the Institute mentioned under Association (Refs. 1 - 4). Recently, interesting results have been obtained with respect to the decrease of the average discharge gradient. The scheme of the experimental arrangement shown in Fig. 1 is discussed. Recording of voltage was carried out by means of an oscillograph and a capacitive voltage divider. Fig. 2 shows the discharge characteristic of the experimental device for various lengths of the discharge gaps between the rods used and the earthed plate. The voltage minimum occurring for all distances between 100 and 375 cm within the range of 150 - 180 μsec of the time of

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A Considerable Decrease of the Average Breakdown Gradients in Long Discharge Gaps With an Oblique-angled Voltage Wave

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discharge is pointed out. This characteristic is explained by a discussion of the processes before the discharge in the discharge gap. The occurrence of discharge is dealt with, and it is shown that in the left part of the characteristic a certain inertia of the processes before the discharge occurs (in the case of short discharge times). This inertia decreases with an increase of the times of discharge, and the blocking action of the space charge formed in the development of the corona grows. This blocking action was investigated by the authors by means of alternating current (industrial frequency). The discharge characteristics of the same discharge gap are shown in Fig. 3. From a discussion of these results and the dependence of the average discharge gradient on the length of the discharge gap as shown in Fig. 4, the authors conclude that by the effect produced by the oblique-angled wave and the alternating current, the zone of the unipolar volume charge is limited, and that above all this volume charge does not depend on the length of the discharge gap. There are 4 figures and 7 references: 6 Soviet and 1 German.

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A Considerable Decrease of the Average Breakdown Gradients in Long Discharge Gaps With an Oblique-angled Voltage Wave

S/020/60/133/03/02/013
B019/B056 82273

ASSOCIATION: Energeticheskiy institut im. G. M. Krzhizhanovskogo Akademii nauk SSSR (Institute of Power Engineering imeni G. M. Krzhizhanovskiy of the Academy of Sciences of the USSR)

PRESENTED: March 26, 1960, by L. A. Artsimovich, Academician

SUBMITTED: March 25, 1960

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STEKOL'NIKOV, Il'ya Samuilovich, prof.; KADER, Ya.M., red.; KRASAVINA, A.M., tekhn. red.

[Science and religion about lightning and thunder] Nauka i religiia o molnii i grome. Moskva, Voen.izd-vo M-va oborony SSSR, 1961. 93 p. (MIRA 14:12)
(Religion and science) (Lightning)

BRAGIN, S.M.; BUTAKOV, I.N.; KRASIN, A.K.; SOKOLOV, A.A.; STEKOL'NIKOV, I.S.; TAREYEV, B.M.; FIALKO, Ye.I.; CHILIKIN, M.G.

Fiftieth anniversary of the birth of Professor A.A.Vorob'ev.
Elektrichestvo no.1:93 Ja '61. (MIRA 14:4)
(Vorob'ev, Aleksandr Akimovich)

POPKOV, V.I.; TOLSTOV, Yu.G.; STEKOL'NIKOV, I.S.; MEYEROVICH, E.A.; MOSKVITIN, A.I.; TAFT, ~~V.A.;~~ ~~GORUSHKIN~~, V.I.; SOVALOV, S.A.; LIBKIND, M.S.

Sixtieth birthday of I.M. Markovich. Elektrichestvo no.5: 87 My '61. (MIRA 14:9)
(Markovich, Isaak Moiseevich, 1901-)

STEKOL'NIKOV, I.S.; SHKILEV, A.V.

New data on the development of a long-spark channel. Dokl. AN SSSR 136 no.4:803-806 F '61. (MIRA 14:1)

1. Energeticheskiy institut imeni G.M. Krzhizhanovskogo Akademii nauk SSSR. Predstavleno akademikom L.A. Artsimovichem.
(Electric spark)

POLIVOV, V.I.; ZAKHARIN, A.G.; MARKOVICH, I.M.; TOLSTOV, Yu.G.; GURVICH, D.A.; KRACHKOVSKIY, N.N.; LEBEDEV, N.N.; MIKHAYLOV, V.I.; DENISOV, V.I.; MOSKVITIN, A.I.; MEYEROVICH, E.A.; TELESHEV, B.A.; STEKOL'NIKOV, I.S.; LAPITSKIY, V.I.; KELYSTER, I.M.

Veniamin Isaakovich Veits; obituary. Elektrichestvo no.4: 91-92 Ap '61. (MIRA 14:4)
(Veits, Veniamin Isaakovich, 1905-1961)

S/020/61/141/005/008/018
B104/B102

AUTHOR: Stekol'nikov, I. S.

TITLE: New results on the initial stages of sparks

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 5, 1961, 1076-1077

TEXT: A new electron-optical transformer, "eopograf", designed at the Laboratoriya vysokovol'tnogo gasovogo razryada Energeticheskogo instituta im. G. M. Krzhizhanovskogo (Laboratory for High-voltage Gas Discharge of the Power Engineering Institute imeni G. M. Krzhizhanovskiy), was used to study the development of sparks. It permitted to picture the "elements" of a pulse corona (columns and branches). The mean velocity of the discharge branches (positive sphere, negative plate) was found to be with 10^9 cm/sec, that of the columns was with 10^8 cm/sec. By fast scanning, the eopograph permitted to find out that not only velocities but also structures of the branches of a corona differed essentially. Furthermore, a calibrated electron beam oscilloscope revealed that the propagation rate of the branches was subject to strong changes. In the first stage where the branches reach about half their length, the velocity is $V_1 \approx 5 \cdot 10^9$ cm/sec,

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New results on the initial ...

in the second stage, it is $V_2 \sim 2 \cdot 10^8 - 3 \cdot 10^8$ cm/sec. Studies of the pulse corona in case of the sphere being negative and the plate positive showed branches and columns to be of analogous structure. Results obtained by using a discharge gap of 52 cm, a ball diameter of 12.5 cm, and a voltage of U = 440 kv showed that the branches were propagating at a rate of $V_1 \sim 5 \cdot 10^9$ cm/sec in the first stage, and at a rate of $V_2 \sim 2 \cdot 10^8$ cm/sec in the second stage. Columns and plasma channels develop long before the contact between branches and plate becomes visible. The mean velocity of the plasma channels is about $2 \cdot 10^7$ cm/sec. The leader channel is developing with a bright head of small extension (2-3 cm), which vanishes after its formation and is regenerated in the neighborhood of its preceeding position. The channels of the branches are also extended in this way. Each flash of the leader head results in the formation of beams of rays moving at a velocity of $4 \cdot 10^7$ cm/sec toward the plate. A special study has shown that the beams develop in a similar way as the branches of a pulse corona and that they reach notable lengths. A. V. Shkilev assisted in the experiments. Ye. N. Brago is mentioned. There are 4 figures and 3 references: 1 Soviet and 2 non-Soviet. The reference to the English-language publication reads as follows: J. H. Park, H. N. Cones, J. Res.

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S/020/61/141/005/006/018
B104/B102

New results on the initial ...

Nat. Bur. Stand., 66, no. 1 (1961)

ASSOCIATION: Energeticheskiy institut im. G. M. Krzhizhanovskogo Akademii nauk SSSR (Power Engineering Institute imeni G. M. Krzhizhanovskiy of the Academy of Sciences USSR)

PRESENTED: July 4, 1961, by L. A. Artsimovich, Academician

SUBMITTED: June 18, 1961

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GORUSHKIN, V.I.; KOVAL'KOV, G.A.; KOZLOVSKIY, G.F.; LUTIDZE, Sh.I.; MARKOVICH, I.M.; MEYEROVICH, E.A.; MIKHNEVICH, G.I.; POPKOV, V.I.; STEKOL'NIKOV, I.S.; TAFT, V.A.; TOLSTOV, Yu.G.

Sixtieth anniversary of the birth of A.I. Moskvitin. Elektrichestvo no.4:94 Ap '62. (MIRA 15:5)
(Moskvitin, Anatolii Ivanovich, 1902-)

STEKOLNIKOV, I. S.; SHKILEV, A. V.

"New Data on Negative Spark Development and its Comparison with Lightning" International Conference on Gas Discharges and the Electricity Supply Industry", 7-11 May 1962, Leatherhead, UK.

1. Krzhizhanovski Power Institute, Laboratory of High Voltage Gas Discharges, Moscow, U. S. S. R.

STEKOLNIKOV, I..S.; BRAGO, Ye. N.; BAZELYAN E. M.

"The Peculiarities of Oblique Wave Front Discharges and their role in the Estimation of EHV Transmission Line Insulation"
To be submitted at the International Conference on Gas Discharges and the Electricity Supply Industry, 7-11 May 1962, Leatherhead, UK.

1. High Voltage Gas Discharge Laboratory, Moscow, U. S. S. R.

AS, U.S.S.R.

STEKOL'NIKOV, I.S., doktor tekhn.nauk, prof.; GORIN, B.N., inzh.

Effect of lightning strokes which have bypassed the grounding wires on high-voltage power transmission lines. Elektrichestvo no.6:82-84 Je '62. (MIRA 15:6)

1. Energeticheskiy institut imeni Krzhizhanovskogo.
(Electric lines--Overhead)
(Electric protection)

STEKOL'NIKOV, I.S., doktor tekhn.nauk, prof.; BAZELYAN, E.M., inzh.

Decreasing of the insulation disruptive voltage in electric power systems during certain kinds of switching surges. Elektrichestvo no.7:36-40 Jl '62. (MIRA 15:7)

1. Energeticheskiy institut imeni Krzhizhanovskogo.
(Electric insulators and insulation)
(Electric power distribution)

S/058/63/000/001/001/120
A059/A101

AUTHOR: Stekol'nikov, I. S.

TITLE: The development of the science of lightning and long spark

PERIODICAL: Referativnyy zhurnal, Fizika, no. 1, 1963, 5, abstract 1 A17 (In collection: Vopr. istorii yestestvoznan. i tekhn., M., AN SSSR, no. 12, 1962, 75 - 92)

TEXT: The history of the discovery and the study of the nature of lightning and long spark is illustrated. Franklin's investigations of atmospheric electricity and the establishment of lightning protection methods, and the results of Lomonosov's and Richman's work on the study of thunderstorm phenomena are described. The investigations of lightning and long spark are stated to have been started in the thirties of the 20th century. The results of investigations of sparks which can be obtained in high-voltage laboratories, details of the development of spark discharge, and results of the photographic study of lightning are described. Schematic diagrams of the shock-type development of lightning and repeated lightning are given. Finally, the results of a study of lightning protection methods are

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S/058/63/000/001/001/120
A059/A101

The development of the science of...

described.

V. Dukov

[Abstracter's note: Complete translation]

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19821
S/057/62/032/008/010/015
B104/B102

AUTHORS: Stekol'nikov, I. S., Brago, Ye. N., and Bazelyan, E. M.

TITLE: Reduction of discharge voltage in long oblique-wave discharge gaps

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 8, 1962, 993 - 1000.

TEXT: The characteristics of an oblique wave discharge gap rod - surface (S_o = 50 - 590 cm) with wave fronts of 20 to 700 μsec were examined (Fig. 4a). The voltages were recorded with an oscilloscope and a capacitive voltage divider. U_b (break-down voltage), as a function of t_b the time until the voltage at the discharge gap reaches the breakdown voltage), has a minimum at t_b = 150 - 250 μsec. If S_o is increased from 50 to 590 cm the field strength decreases from 4.7 kv/cm to 2.25 kv/cm; for ordinary pulsed waves the field strength for S_o = 1 - 4.5 m is 5.35 kv/cm. The curve $U_b(t_b)$ can be explained qualitatively by studying

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the volume charge in the zone near the electrode as a function of the steepness of the wave fronts. When the experiment is made with $U_{b\ min}$ it is possible to get discharges of several meters at voltages much lower than those needed for d-c or a-c discharges. The dependence of U_b on the rise time has to be taken into account when determining the ЛЭП (LEP) insulation value under the action of commutating overvoltages. There are 6 figures.

ASSOCIATION: Energeticheskiy institut im. G. M. Krzhizhanovskogo Moskva (Power Engineering Institute imeni G. M. Krzhizhanovskiy, Moscow)

SUBMITTED: April 27, 1961 (initially)
August 20, 1961 (after revision)

STEKOL'NIKOV, I.S.; SHKILEV, A.V.

New data on the development of a negative spark as compared with lightning. Dokl.AN SSSR 145 no.4:782-785 Ag '62. (MIRA 15:7)

1. Energeticheskiy institut im. G.M.Krzhizhanovskogo. Predstavleno akademikom L.A.Artsimovichem.
(Electric spark)

STEKOLNIKOV, I.S.

"Research on the long negative spark and the problems of lightning."

Report submitted to the Third Intl. Conf. on Atmospheric and Space Electricity, Montreaux, Switzerland May 1963

STEKOL'NIKOV, I.S.; BAZELYAN, E.M.

Reply of the authors. Elektrichestvo no.7:87-88 Jl '63. (MIRA 16:9)

(Electric insulators and insulation)

STEKOL'NIKOV, I.S.; SHKILEV, A.V.

Development of a long positive spark on an oblique voltage wave. Dokl. AN SSSR 151 no.4:837-840 Ag '63. (MIRA 16:8)

1. Predstavleno akademikom L.A.Artsimovichem.
(Electric spark)

L 15464-63 EWT(l)/BDS AFFTC/ASD
ACCESSION NR: AP3005437 S/0020/63/151/005/1085/1088

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AUTHORS: Stekol'nikov, I. S.; Shkilev, A. V.

TITLE: Analysis of the mechanism of the negative spark

SOURCE: AN SSSR. Doklady*, v. 151, no. 5, 1963, 1085-1088

TOPIC TAGS: spark formation mechanism, electrical discharge in gas, spark sweep photograph, electrical discharge, gas

ABSTRACT: Authors studied spark development under exponential waves of applied voltage, which is characterized by an average slope between time zero and a time equal to 2.3 of the time constant. Figures 1, 2, and 3 show the sweep photograph of the spark development with respect to time. Figure 4 shows the processes schematically. A detailed description of the different stages of the process is given. The main features leading to spark breakthrough are: (i) polar corona; (ii) stepped spark leader; (iii) negative leader and jump-like leader; (iv) volume leader; (v) positive leader; (vi) final jump; (vii) the main channel. Orig. art. has: 4 figures.

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S/0026/64/000/005/0042/0050

ACCESSION NR: AP4038693

AUTHOR: Stekol'nikov, I. S. (Professor)

TITLE: Nature of a long electric spark

SOURCE: Priroda, no. 5, 1964, 42-50

TOPIC TAGS: electric spark, lightning, electricity, image converter, atmospheric electricity, eopograph

ABSTRACT: The nature and mechanism of lightning are described briefly; the author already has described this phenomenon in detail (Priroda, 1953, No. 4, pages 19-30). In that source he noted that many properties of lightning can be studied by use of a long electric spark. Such investigations since have been made in many countries; this paper is limited to discussion of investigations of a long, multimeter spark in the air. Specifically, the author describes the investigations made in the Laboratory of High-Voltage Gas Discharges and Lightning Protection of the G. M. Krzhizhanovskiy Electric Power Institute. Creation of the required spark requires a high-voltage generator for creating brief high-potential discharges (millions of volts); the generator used at the institute is described. The spark is recorded photographically, using an electronic oscillograph. Processes with a duration of a

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