

CONTENTS

Preface	v
<u>I ELEMENTARY PROCESSES AND GAS DISCHARGES</u>	
I.1 ELEMENTARY PROCESSES	1
I.1.a Electron and ion transport phenomena	3
Orders of approximation in transport theory for electrons or holes in a scattering medium G.Cavalleri, E.Gatti, F.Gonzalez-Gascon	3
Post-Davydov solution with third order accuracy for the electron distribution function in weakly ionized gases G.Cavalleri, R.Bonalumi	4
A highly accurate and simple expression of electron drift velocity in gases and semiconductors G.Cavalleri	5
Electron diffusion in argon in a finite enclosure: the effect of diffusion cooling R.W.Crompton, K.Kumar, H.I.Leemon, T.Rhymes	6
Measurement of the diffusion coefficient for thermal electrons and a new estimate of the scattering length for neon R.W.Crompton, T.F.O'Malley, T.Rhymes, G.Cavelleri	7
Driftvelocities of the ions in the Townsend discharge J.G.A.Hölscher	8
A comparison of electron transport coefficient predictions using spherical harmonic and Monte Carlo methods L.E.Kline, J.J.Lowke	9
A measurement of the momentum transfer cross-section of electrons in molecular oxygen N.L.S.Martin, A.von Engel	10
The peculiarities of calculation of ionization coefficient α in oxygen M.V.Sokolova, I.M.Safronova	11

I.1.b Decay processes in afterglows	12
Mass-spectrometric investigation of the plasma ion composition in helium pulse discharge V.B.Borisov, G.M.Grigorian, V.S.Egorov, N.M.Zatserkovnjuk, A.A.Pastor	12
On the production of argon excimers R.Bouciqué, P.Moerman	13
Deexcitation rate constants of the $^3P_{2,1,0}$ and 1P_1 states of argon by N_2 , H_2 and CO J.le Calve, M.Bourene, O.Dutuit	14
Elementary processes in a high pressure helium afterglow R.Deloche, P.Monchicourt, M.Cheret, F.Lambert	15
Selective excitation spectroscopy in helium afterglow plasmas J.P.Moy, J.C.Gauthier, J.P.Geindre	16
Transfert par collision électronique entre les niveaux métastables (3P_2) et résonnant (3P_1) de l'argon dans la phase de post-déchargé N.Sadeghi	17
I.1.c Absorption, emission and scattering of radiation	18
Quasistatic spectra of atoms absorbing intense electromagnetic radiation in a plasma F.F.Baryshnikov, V.S.Lisitsa	18
Experimental investigation of the H^- shape resonance K.Behringer, P.Thoma	19
The kinetics of atomic excitation and the polarization of line radiation from a nonequilibrium plasma E.P.Busygin, V.G.Grigoryants	20
Photoelectron statistics of resonance fluorescence light from a small quantity of ^{20}Na atoms in 100 Torr neon F.C.M.Coolen, P.Menger	21
Population of bromine resonant levels in the discharge of a Kr- Br_2 mixture V.Henč-Bartolić, A.Peršič, D.Soldo	22
The spectrum of the negative oxygen ion H.Hoffmann	23

Multiphoton ionization of atomic hydrogen, absorbing some extra photons E.Karule	24
Radiative collisions of gas atoms in the presence of intense electromagnetic field V.A.Kovarsky, N.F.Perelman, S.S.Todirashku	25
Escape factor for frequency dependent source function A.Kuszell, N.G.Preobrazenski, S.Suckewer	26
Experimental evidence of electron-atom inverse bremsstrahlung in argon M.Louis-Jacquet, A.Blanc	27
A further evidence of the validity of the polarization method of cascade-free lifetime measurement J.Pietruszka, J.Chmiela, K.Melzacki	28
On the approximation of the optically thin layer in plasma spectroscopy N.G.Preobrazhensky	29
Inverse Faraday effect in plasmas Bernard Talin, V.P.Kaftandjian, Lewis Klein	30
Raman scattering from Al, Ga, In and Tl atoms in metal-halide arcs L.Vriens, M.Adriaansz	31
Radiation from plasma focus in the range of 1 - 40 eV V.D.Zvorykin, A.S.Kamrukov, G.N.Kashnikov, A.D.Klementov, N.P.Kozlov, V.A.Malascenko, Yu.S.Protasov, V.B.Rozanov	32
I.1.d Miscellaneous inelastic processes	33
The cross-section of associative generation of Cs_2^+ ions for different excited states of atoms E.E.Antonov, Yu.P.Korchevoy, V.I.Lukashenko, I.N.Hilko	33
Negative ions in a $\text{CO}_2\text{-N}_2\text{-He}$ mixture plasma Martha Bacal, H.J.Doucet	34
Investigation of the energy distribution of positive ions in a low temperature plasma N.A.Borodin, D.Ya.Dudko, Yu.P.Korchevoy, V.N.Makarchuk	35

x

The contribution of vibrational excitation of the rate of CO ₂ dissociation in radiofrequency discharges at moderate pressures P.Capezzuto, F.Cramarossa, R.d'Agostino, E.Molinari	36
On the ion motion effect in stark profiles of hydrogen lines in a plasma A.V.Demura, V.S.Lisitsa, G.V.Sholin	37
Dynamics of ionization and radiation of impurity ions in plasma Y.N.Dnestrovskii, I.N.Inovenko, D.P.Kostomarov, V.F.Strizhov	38
Mass composition of positive and negative ions in alkali plasma D.Ya.Dudko, Yu. P.Korchevoy, V.N.Makarchuk	39
The secondary electron energy distribution in a fast-beam created nitrogen plasmas P.D.Edgley, P.Rockett, C.L.Brundin, A.von Engel	40
Atomic level population densities in decaying overcooled helium plasma S.S.Filippov, V.V.Yevstigneyev	41
Mass spectrometric study of the discharge catalyzed reaction $2 \text{CO}(\text{g}) \rightarrow \text{C}(\text{s}) + \text{CO}_2(\text{g})$ M.R.Haque, H.R.Oswald, S.Vepřek	42
The influence of metastable states on ionization processes in N ₂ S.C.Haydon, O.M.Williams	43
Isotope exchange and vibrational relaxation in ion-molecule collisions G.V.Karachevtsev, V.L.Tal'rose, P.S.Vinogradov	44
Mass-spectral study of CF ₃ I and C ₃ F ₇ I photolysis M.N.Larichev, I.O.Leipunskii, I.I.Morozov, V.L.Tal'rose	45
Mass-spectrometric study of ionic composition in kalium-nitrogen discharge plasma N.D.Morgulis, A.M.Pržonsky	46
I.2 LOW-PRESSURE DISCHARGES	47
I.2.a Positive column	49
Experimental study of similarity conditions for electron-energy distribution function in helium-cesium plasma K.D.Asvadurov, I.A.Vasilieva	49
Influence of the atom-atom collisions in a mercury-argon discharge balance J.J.Damelincoart, A.Dimitriadis, L.Scoarnec	50

Unified electron temperature characteristics in Ne and He positive columns Toshihiko Dote, Yukimi Ichikawa	51
The positive column in electronegative gases P.D.Edgley, A.von Engel	52
The non-neutral positive column including ion temperature R.N.Franklin	53
Balmer radiation from magnetized hydrogen plasma and electron density estimates from collisional-radiative model A.K. Hui, P.K. Ghosh	54
The steady state characteristics of a large volume collisional plasma contained by permanent magnets H.G.Jones, G.Lauer	55
On the nature of the stationary processes in Penning type high voltage discharge N.A.Kervalishvili, V.P.Kortkhonjia	56
Electronegative discharge plasma with space charges P.Kocian	57
Plasma stratification in the anode area of the glow discharge in a gas flow R.I.Kopyrina, G.D.Mylnikov, A.A.Vedenov	58
An experimental study of metastable atom flux to the tube wall in an argon positive column of glow discharge V.Martišovitš, I.Košinár, P.Tarábek, Š.Veis	59
A theoretical study of metastable atom diffusion in a positive column of glow discharge V.Martišovitš, I.Košinár, Š.Veis	60
Transition from weak to intense gas discharge in crossed electric and magnetic fields V.I.Miljević	61
Influence of atomic to molecular ions conversion on the radial charge distribution in the positive column G.Musa, A.Popescu	62
Dissociative attachment instability in partially ionized molecular plasmas V.N.Oraevsky, O.I.Fisun, E.I.Yurchenko	63

Application of electron atom bremsstrahlung of rare gas medium pressure discharges as a reference radiation in the spectral range 200...700 nm S.Pfau, A.Rutscher, R.Winkler	64
N ₂ -dissociation in glow discharge L.S.Polak, P.A.Sergeev, D.I.Slovetsky, R.D.Todesaite	65
Glow discharge characteristics for inert gases-hydrogen mixtures V.A.Pozharskiy	66
Contraction phenomena in a medium pressure neon discharge, part I measurements M.Prins, R.M.M.Smits	67
Contraction phenomena in a medium pressure neon discharge, part II model calculations R.M.M.Smits, M.Prins	68
Calculations on the electron energy distribution function in a medium pressure neon discharge C.J.van Duyn, M.Prins, R.M.M.Smits	69
Cataphoresis in neon-nitrogen mixtures C.Sanctorum	70
Influence of helium on the ionisation-recombination balance in a cesium-helium discharge B.Sayer, M.Ferray, G.Gousset, J.Loizingot	71
Ions in the N ₂ /H ₂ low pressure glow discharge plasma M.Schmidt	72
The physics of gas discharge display cells J.M.S.Schofield	73
The continuum radiation of a medium pressure neon discharge R.M.M.Smits, M.Prins	74
Energy transfer between electrons and ions in a highly ionized plasma B.van der Sijde, J.Dielis, B.Pots, D.C.Schram	75
The dynamics of longitudinal cataphoresis in direct current discharges A.A.Zaitsev, N.A.Miskinova	76
I.2.b Afterglow	77
Population densities of fast transient oxygen plasmas M.Cacciatore, M.Capitelli	77

Measurement of the density of the neon atoms in the 3P_2 and 3P_1 state by means of optical fluorescence in a plasma produced by a protonbeam F.C.M.Coolen, P.J.K.Langendam, N.van Schaik	78
Determination of the plasma ion composition in the positive column of neon glow discharge Ju.B.Golubovsky, V.A.Ivanov, Ju.M.Kagan, A.O.Morozov	79
Computation of densities in a rare gas afterglow J.W.Hayter, E.R.Wooding	80
Determination of electron density distribution in an afterglow plasma O.Mikuš, P.Lukáč, M.Mastihuba	81
The early afterglow in a pulsed helium discharge Milton D.Scheer	82
Fluorescence measurement in the afterglow of a low pressure neon gas discharge L.W.G.Steenhuysen, J.W.Denneman	83
I.2.c Breakdown	84
Breakdown effects in cesium diode F.Baksht, V.Ivanov, V.Kaplan, E.Maniachine, A.Martsinovski, B.Tsirkel, V.Yuriev	84
Influence of de-excitation reactions on the breakdown voltage of argon mercury Penning mixtures G.Bergmann	85
The "burning zones" in self-quenching Geiger-Müller counters Rafi Mohammed Chaudhri, M.Munawar Chaudhri	86
Analysis of the secondary ionization coefficient in argon discharges L.DeVreese, W.Bruynooghe	87
High voltage ignition of a crossed field discharge Robin J.Harvey, Michael A.Lutz	88
The electrical breakdown of air at radio frequencies in the H.F.band S.C.Haydon, I.C.Plumb	89
On time delay of gas discharge in pulsed lamps used as laser pumps N.A.Kozlov, V.V.Fomin, L.I.Shchukin	90

Statistical time lags under non-poisson conditions Beaufort M.Lancaster, Jr., J.Kaare	91
Deviation from the laws of Paschen and Townsend for high pressure discharges E.D.Lozański, G.B.Pontecorvo	92
Experimental study of the statistical lag of breakdown of an ultraviolet sensitive phototube L.Năstase	93
The breakdown of deuterium at low pressure A.B.Parker, J.D.Pace	94
Current passage in a diode with local ionization I.N.Shevtsova, Yu.E.Kreindel	95
Investigation of the breakdown in an argon low pressure hollow cathode H.Störi, T.D.Märk, W.P.Allis, M.Pahl	96
The conditions of positive space charge accumulation at high frequency voltage T.N.Tarasova	97
I.2.d Hollow cathode	98
The role of neutral atoms in the positive column of a hollow cathode discharge fed with argon F.Boeschoten, R.Komen, A.Sens	98
Estimation of energy losses of fast electrons in the hollow cathode discharge plasma A.S.Metel, A.I.Nastyukha	99
Hollow cathode discharge in the transverse magnetic field with a foreign body in the cavity A.S.Metel, A.I.Nastyukha	100
I.2.e Ion sources and reflex discharges	101
On determination of dissociation degree of hydrogen in monoplasmatron M.A.Abroyan, Yu.M.Kagan, N.B.Kolokolov, B.P.Lavrov	101
Production and abundance measurements of multicharged ions in ECR produced plasmas P.Briand, R.Geller, B.Jacquot, C.Jacquot, A.Theiss	102

Optimization of the multi-aperture ion extraction system in a 10-cm diameter RF-ion source J.Freisinger, H.W.Loeb, N.Seibt	103
The investigation of conditions of the effective electron extraction across the cathode side of the reflex discharge V.A.Gruzdev, Yu.E.Kreindel, L.P.Ponomareva	104
Electron energy distribution in low pressure arc discharge of monoplasmatron geometry Ju.M.Kagan, N.B.Kolokolov, B.P.Lavrov, R.I.Lyaguschenko	105
Electron distribution function and excitation coefficients in the plasma of a reflex discharge in nitrogen G.Leclert	106
Beam-magnetron discharge V.A.Saenko	107
I.2.f High frequency discharges	108
UHF xenon discharge in long tubes V.A.Dovzhenko, P.P.Melnichenko, G.S.Solntzev	108
Mercury R.F. plasma investigation V.A.Godjak, A.A.Kuzovnikov, O.A.Popov	109
Comparative studies of high-frequency and direct current molecular gas discharges V.H.Goichman, V.M.Goldfarb, M.B.Tendler	110
A comparative investigation of UHF and DC glow discharge plasmas at reduced pressure Yu.Ivanov, Yu.A.Lebedev, L.S.Polak	111
Rotational instability of Penning type high voltage discharge N.A.Kervalishvili, V.P.Kortkhonjia	112
Investigation of the UHF high pressure discharge in He, N ₂ and CO ₂ V.A.Krugialov, T.M.Perchanok, D.K.Teriochin, S.A.Fridrihov, L.D.Zendin	113
Excitation of low frequency oscillations in ultra high frequency discharge plasma S.I.Nanobashvili, G.I.Rostomashvili, N.L.Tsintsadze	114
Experiment on the parametric electron cyclotron resonance at first and second modes in a HF discharge plasma Arcot M.Punithavelu, K.S.Golovanivsky	115

On the stabilization of gas discharge by a HF-electric field T.V.Rakhimova, A.T.Rakhimov	116
I.2.g Waves	117
Some phenomena in hydrogen and deuterium wall contained plasmas at pressures near the Poletaev limit Richard J.Armstrong	117
Moving and stationary SHF-discharges in argon and helium with nitrogen admixtures V.M.Batenin, V.F.Chinnov, I.I.Klimovsky, H.V.Naidis, V.S.Zrodnikov	118
Striations (ionization waves) in a longitudinal gas stream G.A.Galechyan, S.I.Petrosyan	119
Instability of spatially periodic high amplitude ionization waves I.Grabec	120
Instability of a coherent wave motion J.Krása, L.Pekárek, R.M.Perkin	121
Ionization wave in presence of an axial magnetic field and a macroscopic instability in positive column H.Murlak, Z.Zakrzewski, Z.Nemeček	122
The influence of periodic perturbation on moving striations A.A.Saitsev, W.W.Ilinsky, J.A.Savchenko	123
Current chopping space charge layers in a low pressure arc plasma S.Torvén, M.Babić	124
I.2.h Jets and discharges in various geometries	125
Electrode phenomena in low voltage arc in alkaline metal vapour F.G.Baksht, G.A.Djuzhev, N.K.Mitrofanov, B.I.Tsirkel, S.M.Shkolnik, V.G.Yuriev	125
Nonequilibrium phenomena in transonic plasma jet V.M.Goldfarb, B.N.Gurevich, R.B.Pankova	126
Spectroscopic investigation of MPD argon jet V.M.Goldfarb, E.V.Ilyina, G.A.Lukyanov, V.V.Sachin	127

Thermally produced plasma mixtures A.D.R.Phelps, J.E.Allen	128
I.3 HIGH PRESSURE DISCHARGES	129
I.3.a Basic phenomena	129
Mathematical modelling of a dynamic arc A.V.Avdonin, V.G.Egorov, K.I.Serjakov	131
Axial velocities in high current free burning arcs M.R.Barrault, D.C.Strachan	132
Properties of arc heated air U.Bauder, J.G.Cailleteau, R.S.Devoto, E.Shires	133
Measurements on a decaying hydrogen arc plasma W.Bez, G.Bauer	134
The photon absorption cross-section of Na_2 molecules and the influence of these molecules on the spectrum of the high pressure sodium arc J.J.de Groot, J.van Rooijen	135
Decay of level $1s_2$ of argon in an extinguishing arc J.P.Dinguirard, H.Kafrouni, I.Pagès, S.Vacquié	136
The free recovery of arcs in a constant pressure flow M.T.C.Fang, S.K.Chan, M.D.Cowley	137
Improved model of strongly radiating discharge in xenon S.S.Filippov, B.A.Konstantinov, I.I.Litvinov, E.D.Lumkis	138
Dynamics and energy balance of nanosecond gas discharges K.Guenther, H.Hess	139
The smallest energy values of intensively cooled high- pressure arc of alternating current of constant length Otto Havelka	140
Voltage gradients of free-burning arc column in liquid nitrogen T.Inaba	141
Emission-absorption measurements of diffusion-dominated arc plasmas Lothar Klein	142

The effect of electrode material and polarity on high current arcs in an air blast circuit breaker D.Lidgate, G.R.Jones, D.C.Strachan	143
Calculated properties of vertical arcs stabilized by natural convection J.J.Lowke	144
High density correction of the Boltzmann factors of highly excited argon I levels in a LTE plasma and the influence on the determination of transition probabilities H.Nubbemeyer, B.Wende	145
Temperature measurements on mercury arcs - a new set of Hg I transition probabilities W.Pilz, J.Seehauer	146
Electrical implosion of metal cylinder as strong light source M.Soszka, W.Soszka	147
On the dissociation energy transport in atmospheric pressure hydrogen arcs B.Stefanov, L.Zarkova	148
A study of the radiative energy losses for an arc in uniform air flow D.C.Strachan	149
High current free burning graphite arcs D.C.Strachan	150
Continuum radiation from arcs in mercury and iodine mixtures R.J.Zollweg, R.W.Liebermann	151
I.3.b Breakdown	152
Breakdown process of point to plane gap in air under negative impulse voltage M.Akazaki, I.Tsuneyasu	152
Correlation of breakdown mechanisms of short N ₂ sparks with typical line radiation in the vacuum-UV region H.Albrecht, R.Maly, E.Wagner	153
Influence of surface protrusions and dust on the breakdown voltage in compressed air S.Berger	154

The influence of gas compressibility and electrode surface roughness on the breakdown of compressed SF ₆ B.H.Crichton, Dong-in Lee	155
Effect of gas flow on point-plane corona and breakdown in nitrogen R.C.Davidson, O.Farish	156
An estimation of the distribution type for the electrical strength of sulphur hexafluoride W.Hauschild, W.Bürger	157
Electrical breakdown of the cathode sheath during extinction of ac arc A.Holi, Z.Tarociński	158
Electrical breakdown initiation by an ultra-violet irradiation in a trigatron N.V.Juckov, G.M.Gontcharenko	159
Leader stage of a discharge from the positive electrode V.P.Larionov	160
Fast mode of spark channel development M.M.Kekez, P.Savic	161
On the determination of the distribution function for the electrical strength of sulphur hexafluoride W.Mosch, W.Hauschild	162
Time resolved measurements of electron densities in the nsec-range during spark breakdown in N ₂ at 1 bar B.Saggau	163
The transition of an avalanche into an anode-directed streamer in a uniform field gas gap J.G.Sergeev	164
Resistance of a spark channel Antonios E.Vlastós	165
The breakdown process of a trigatron gap in air Y.Yoshida, K.Sugita, S.Nagao	166
On the streamer breakdown in xenon A.I.Zakharov, Yu.K.Zemtsov, I.V.Marinov, A.P.Osipov	167
I.3.c Glow and corona discharges	168
SHF-discharges of hydrogen and helium at atmospheric pressure V.M.Batenin, V.F.Chinnov, V.K.Roddatis, V.S.Zrondnikov	168

xx

About the mechanism of propagation of SHF-discharges in inert gases V.M.Batenin, I.I.Klimovsky, V.R.Khamraev	169
Electrode surface field measurement during positive glow corona J.Beattie, J.D.Cross	170
Rectifying effect of corona discharges I.B.Jordan, R.Saint-Arnaud	171
Distribution of luminosity at the onset of a HF corona M.Laan, K.Kudu	172
The structure of corona discharge envelope in air at audio frequency voltage V.P.Larionov, E.S.Koletchitsky, J.G.Sergeev	173
On the contraction of high-frequency gas discharge with account of electron overheat M.A.Liberman, B.E.Meierovich	174
Experimental study of non-self-maintained glow discharge stability in molecular gases L.P.Menakhin, E.K.Yeroschenkov, I.O.Sibirjak, K.N.Uiyarov	175
Study of non-self maintained glow discharge in gas flow V.I.Perevodchikov, K.N.Ulyanov, A.A.Kostylev, Y.I.Londer N.M.Maslennikov, L.P.Menahin, I.O.Sibirjak	176
Investigations into electrical and energy characteristics of pulsed non-self-maintained glow discharges in gases and gas mixtures V.I.Perevodchikov, K.N.Ulyanov, E.K.Yeroschenkov, L.P.Menahin, I.O.Sibirjak	177
Statistical delay of impulse corona in air: effect of humidity and ion content R.Saint-Arnaud, I.B.Jordan	178
Investigation of diffusive discharges with resistive electrodes at high pressures J.Spijkerman, H.Zinko	179
Theory of ionization-overheating instability of non-self-maintained glow discharge K.N.Ulyanov, I.N.Shemaeva	180
I.3.d Very high pressure discharges	181
Electrical conductivity of highly non-ideal alkali plasmas at $4000 \leq T \leq 19000$ °K and $130 \leq P \leq 1100$ atm S.G.Barolskiĭ, N.V.Yermokhin, B.M.Kovaliov, P.P.Kulik, V.A.Riabiĭ	181

The thermoelectric effect in the region of the dielectric-metal transition of a dense cesium plasma I.V.Bogomolov, Yu.A.Boiarshinov, N.V.Yermokhin, B.M.Kovaliov, V.Ya.Kulik, P.P.Kulik, A.V.Pallo, V.A.Riabiľ	182
High current arcs in narrow insulating tubes L.Niemeyer	183
Model of dense non-ideal plasma N.V.Yermokhin, B.M.Kovaliov, P.P.Kulik	184
I.3.e Magnetic interaction	185
Interaction of a supersonic plasmajet with a coaxial dipole magnetic field K.Landes	185
Temperature in a rotating plasma disk S.F.Marlier	186
Temperature measurements on a steady magnetically balanced cross-flow nitrogen arc N.Sebald	187
The temperature field of the full circle arc W.Tiller	188
Anode temperature influence on the transition state of the rotating arc M.S.Todorović, V.J.Georgijević, M.Zlatanović	189
Strong penetration of a plasma flow into a magnetic dipole field R.Ullrich	190
I.3.f Circuit breakers	191
Experimental investigation of a DC arc in a nozzle flow R.W.Anderson	191
Integral picture of a stationary cross flow arc W.Hermann, L.Niemeyer, K.Ragaller	192
A stable high current cross flow arc in a channel W.Hermann, L.Niemeyer, K.Ragaller, E.Schade	193
A simple model for high current arcs stabilized by forced convection J.J.Lowke, H.C.Ludwig	194

The characteristics of an a.c.arc in an orifice air flow V.R.Malghan, M.T.C.Fang	195
Correlation and prediction of the quasi-steady state arc behaviour in an orifice air flow V.R.Malghan, M.T.C.Fang, G.R.Jones	196
Comparative dielectric recovery performance of high-pressure SF ₆ -blasted arcs and vacuum arcs J.F.Perkins	197
Pumping, clogging and conductance decay in SF ₆ -blasted nozzle arcs at current-zero J.F.Perkins, L.S.Frost	198
Effects of gas heating on arcs in nozzles D.T.Tuma, J.J.Lowke	199
I.3.g Miscellaneous	200
Impulse plasma flows parameters investigation V.A.Aleksandrov, L.A.Gomilka, L.N.Lesnevsky, G.A.Popov, V.N.Turin	200
Heattransfer investigation from turbulent electric arc to wall at film cooling A.S.Anshakov, M.F.Zhukov, I.M.Zasyppkin, I.I.Mishne, M.I. Sazonov	201
Electricity-numerical solution of the equation of ionized fields; comparison with experimental results G.Canadas, P.Canadas, J.Dupuy, J.Genêt, J.Marsan	202
Electrostatic probe diagnostics of plasma jet at atmospheric pressure Yu.A.Ivanov, D.H.Oliver, A.A.Ovsiyannikov, U.L.Pihlak, L.S.Polak	203
Thermal sheath parameters during short arc extinction H.Lafta, Z.Tarociński	204
Synthesis of XeF ₂ by a high pressure pulsed discharge V.A.Legasov, D.V.Orlinsky	205
Operation of a xenon filled starterless HPSV lamp N.Nguyen Dat, M.Bensoissan	206
A theoretical study of precursor effects in an inert gas (argon) T.V.Zhikhareva, M.G.Vasil'ev	207

I.4 PHYSICS OF LASER DISCHARGES	209
Mathematical modeling of the CO-He mixture flow in gas discharge tube B.V.Alexejev, N.M.Dolgov, V.V.Sokovikov	211
Recombining plasmas as laser sources A.W.Ali, W.W.Jones	212
Components of the anisotropic ion movement in noble gas ion lasers K.Barthel, J.Boscher, J.Salk, G.Schäfer	213
Glow discharge in the cold and preionized air flow A.V.Berdishev, V.M.Goldfarb, D.I.Grigoryev, M.F.Zinkowsky	214
Discussion of a CO ₂ laser model Jean Bonnet, Gérard Fournier, Daniel Pigache	215
Glow discharge in high pressure CO ₂ -N ₂ -H ₂ O gas mixture sustained by a high current electron beam W.W.Byszewski	216
A relation between the positive column instabilities and optical generation of a CO-laser M.Chvojka, M.Novák, V.N.Očkin, L.Pekárek, J.Skála	217
The instabilities in the positive column of some CO ₂ laser gas mixtures M.Chvojka, M.Z.Novgorodov, L.Pekárek, J.Skála, H.Urbánková	218
Discharge parameters in argon lasers at high J.R-values Wilhelm Ebert	219
Investigation of the relationship between plasma and energetic characteristics of the ionic argon laser in the longitudinal magnetic field A.E.Fotiady, S.A.Fridrichov	220
Mode characteristics of a pulsed HCN laser A.Hamonic, M.C.Sexton	221
Instabilities in a CO-laser discharge H.Keren, P.Avivi, F.Dothan	222
Influence of the magnetic field on the increase of optical losses of the Ar ¹⁺ laser J.Kesik, W.Woliński	223
Ionization mechanisms in positive-column He-Cd ⁺ laser discharge Jerzy K.Mizeraczyk, Zenon Zakrzewski	224

Ionization and attachment and breakdown measurements in mixtures of SF ₆ with helium, argon and hydrogen J.L.Moruzzi, J.D.Craggs	225
Experimental verification of a collisional radiative model of the argon ion spectrum B.Pots, B.van der Sijde	226
Doped CO ₂ TEA laser B.J.Reits	227
I.5 ELECTRODE PHENOMENA	229
Hollow cathode arc: Effects of the cathode material on the internal plasma André Brunet	231
Angular distribution of charged and neutral species in vacuum arcs J.E.Daalder, P.G.E.Wielders	232
Dynamic measurements and a simplified model of cathode emission in a moving arc Michel G.Drouet, Sheldon Gruber	233
Spatial relaxation of wall electrons in a plasma G.Ecker, K.U.Riemann, A.Scholz	234
The polarization of spectral lines emitted by secondary particles during bombardment of metallic targets by rare gas ions L.Gabla, M.Szymoński	235
Influence of electrode surface conditions of pre-breakdown emission current in high-voltage vacuum gaps D.D.Gruich, M.Mirрахimov, T.D.Radjabov, M.Asliddinova	236
Remarks on explosive emission in arc spots E.Hantzsche	237
Field emission in the self-sustained Townsend discharge in helium J.G.A.Hölscher	238
Dynamic volt-ampere characteristic of short low-current vacuum arc M.Hrabovský	239
Cathode spot phenomena in vacuum arcs I.Jorde, J.Kulsetås, W.G.J.Rondeel	240
X16H15M3B - type steel erosion under helium ions irradiation B.A.Kalin, N.M.Kirilin, A.A.Pisarev, D.M.Skorov, V.G.Telkovsky S.K.Fedyayev, G.N.Shishkin	241

Temperature blistering on X18H9T-type stainless steel B.A.Kalin, N.M.Kirilin, A.A.Pisarev, D.M.Skorov, V.G.Telkovsky, S.K.Fedyayev, G.N.Shishkin	242
Ion currents associated with the anode spots of vacuum arcs C.W.Kimblin	243
Enhancement of electron thermal emission due to the dense metal vapor close to the cathode spot A.Leycuras	244
Fundamental role of electron explosive emission during vacuum current commutation G.A.Mesyats	245
Cathode region of a capillary mercury jet in arc regime H.Minoo, A.Pilorget	246
About the mechanism of electrode spot initiation in high-current impulsing discharge M.K.Mitskevich, A.I.Bushik, I.A.Bakuto	247
Cathode erosion in highly transient cold cathode arc spots J.Mitterauer	248
Computer simulation of transient joule heating of a cathode protrusion due to high current density field emission J.Mitterauer, P.Till, E.Fraunschiel	249
Trapping and re-emission of helium ions from molybdenum A.A.Pisarev, V.G.Telkovsky, S.K.Fedjaev	250
Phenomena on the surface of thin membrane exposed to ion beam from back side L.Pranevičius, M.Domkus, J.Dudonis	251
Sur le retard à l'amorçage à grande distance Marilena Ungureanu	252
Investigation of electric field distribution in front of cathode in arc discharge M.F.Zhukov, A.S.Anshakov, G.N.B.Dandaron	253

II <u>PLASMA PHYSICS</u>	255
II.1 THEORY	255
II.1.a. Statistical and thermodynamic theory	257
On non-ideal plasma electrical conductivity G.E.Norman, A.A.Valuev	257
The microfield distribution evaluated from the dynamic screening model A.Schumacher	258
Distribution of microfields in non-ideal plasma L.I.Podlubny, S.A.Trigger	259
Ion-electron correlations in stark broadening H.Capes, D.Voslamber	260
On the role of collective effects in inelastic collisions V.P.Shevelko, A.V.Vinogradov	261
On thermodynamic equilibrium of an ionized gas cloud S.K.Kuzmin, S.V.Temko	262
Calculation density of state and autocorrelation function of electrons moving in a dense medium of unordered scatterers A.N.Lagar'kov, A.K.Sarychev	263
II.1.b Transport and kinetic theory	264
Comments on the self-similar behaviour of plasma fluid equations K.E.Lonngren, H.Shen, H.Hsuan, W.F.Ames	264
On the transport properties of a two temperature fully ionized plasma Alf H.Øien	265
Ordering scheme for the collision integrals of the moment method; energy balance as example U.Weinert	266
Recombination plasma transport transverse to the strong magnetic field O.P.Sobolev, G.E.Vekstein	267
Drift-kinetic equation in the presence of HF field V.P.Milantiev	268

Kinetic equation of electrons for a weakly ionized plasma in a strong magnetic field I.A.Krinberg	269
Transport coefficients of high-temperature Ar-N ₂ plasmas M.Capitelli, C.Gorse, P.Fauchais	270
Electron run-away I.B.Levinson	271
The electromagnetic radiation of charged particle in an inhomogeneous plasma located in magnetic field F.A.Kostanyan, H.S.Mergelian	272
The structure of a weak discontinuity in dispersive hydrodynamics A.V.Gurevich, L.P.Pitaevskii	273
II.2 WAVE-PARTICLE INTERACTION	275
II.2.a Electron beam-plasma interaction	277
Experimental investigation of electron bunch dynamics in nonlinear beam-plasma interaction A.M.Gladkii, V.P.Kovalenko	277
Dynamics of a return current induced by the relativistic electron beam in plasma A.V.Arzhannikov, V.S.Koidan	278
Investigation of high energy electrons in a beam generated plasma in a magnetic mirror trap G.Fuchs, H.C.Herbert, K.Wiesemann	279
Radiation and plasma density fluctuations of beam-plasma discharge without magnetic field V.P.Popovitch, I.F.Kharchenko	280
Electron beam radiation in the inhomogeneous plasma waveguide A.I.Rogashkova	281
The envelope solitary wave in the beam-plasma system I.Mori, K.Ohya	282
Bernstein-Greene-Kruskal wave in the beam-plasma system V.T.Astrelin, N.S.Buchelnikova	283

xxviii

II.2.b Ion beam-plasma interaction	284
Lower hybrid beam plasma instability R.P.H.Chang	284
Interaction of an ion beam with a target plasma created by means of a RF-helix P.Massmann, H.J.Hopman, A.Goede, P.de Haan	285
Experimental investigation of intense ion beam-plasma interaction K.Yatsu, Y.Nozaki, S.Hagiwara, S.Kojima	286
Inversion of a radial electric field in the ion-beam plasma and focusing of a positive ion beam M.D.Gabovich, A.A.Goncharov, V.Ya.Poritskii, I.M.Protsenko	287
II.2.c Non linear wave-particle interaction	288
Effects of resonant interaction of nonlinear Langmuir waves with particles in the inhomogeneous plasma J.N.Istomin, V.I.Karpman, D.R.Shklyar	288
The influence of ions on energy losses of heavy charged particle in a plasma located in a strong high frequency electric field H.H.Matevosian	289
On a mechanism of the turbulent shock formation in the rarefied plasma O.V.Volkov, V.G.Yeselevich, G.N.Kichigin, V.L.Paperny, A.M.Fridman	290
II.3 WAVES, WAVE PLASMA INTERACTION	291
II.3.a Wave propagation,excitation damping	293
Dispersion and damping of ion-acoustic-waves A.E.Aubert, W.Van Dael	293
Electron drift velocities from wave amplitude asymmetry V.M.Babović, B.A.Aničin	294
The electromagnetic waves in plasma with non-stationary magnetic field K.A.Barsukov, P.P.Lizogoob	295

Microwave absorption in an overdense plasma column H.Beerwald, G.Böhm, B.Kampmann, B.Schweer	296
Investigation of the space charge axial oscillations in the cross fields G.I.Bondartsov, G.G.Sominsky, S.A.Fridrihov	297
Rezonant instability of low frequency surface waves in magnetoactive plasma with inhomogeneous particle stream V.Čadež, S.Vuković	298
Attenuation of slow electromagnetic waves on radially magnetized annular plasma columns P.K.Cibin	299
Influence of the radial magnetic field on the propagation of surface waves on annular plasma column P.K.Cibin	300
Microwave reflection and absorption by contaminated plasma William A.Janos	301
Laboratory observations of Farley-Buneman instability P.I.John, Y.C.Saxena	302
New features of the dispersion relation of T.E. waves in a hot magnetized plasma for transverse propagation R.Koch	303
"Sheath waves", collisionless damping J.Marec, P.Leprince	304
Resolution of the dispersion relation of a warm magnetoplasma R.L.Meyer	305
On the role of the magnetic field intensity in the process of spontaneous excitation of the ion-cyclotron oscillations in fully ionized plasmas B.Milić	306
Current-driven standing waves as a source for travelling ion waves G.Popa, N.Sato, E.Märk, E.Mravlag, R.Schrittwieser	307
Investigation of the "transillumination" of the wave barrier for electron plasma waves L.I.Romanyuk, N.E.Svavilniy, V.V.Ustalov	308
Quadrupole moment of localized Langmuir perturbation in an electron plasma M.P.Ryutova	309

xxx

High frequency drift waves in E-H accelerators G.G.Shishkin, V.P.Gerasimov	310
Ion acoustic and drift oscillations in a inhomogeneous weakly ionized plasma in magnetic field B.N.Shvilkin, S.A.Postnikov, A.A.Skovoroda	311
Low-frequency drift oscillations in a weakly ionized plasma in a magnetic field B.N.Shvilkin, S.A.Postnikov, A.A.Skovoroda	312
Plasma heating in multiple-resonance excitations John G.Siambis, Albert D.Bender	313
Multiplicative generation of Langmuir solitary waves in the resonant region of nonhomogeneous plasma V.A.Silin	314
Dispersion relation of ionizing waves in positive columns Susumu Takeda, Kazuyuki Ohe	315
Delta-function excitation of whistlers in a cold magnetoplasma Robert J.Vidmar, F.W.Crawford	316
II.3.b Wave-wave interaction	317
Nonlinear wave interaction in plasma waveguide systems N.S.Baranchuk, S.M.Levitsky, M.A.Karmelyuk, E.G.Filonenko	317
Nonlinear coupling of ion-acoustic waves in a plasma M.Čerček, R.Tavzes	318
Plasma heating produced by parametric decay instability above the lower hybrid resonance S.Corti, M.Fontanesi, G.Grosso, E.Sindoni	319
Absolute parametric instability in the inhomogeneous plasma near plasma resonance T.A.Davydova, K.P.Shamray	320
Identification of non linear Landau mechanism for electron plasma waves F.Gervais, G.Matthieussent, J.Olivain, A.Quemeneur	321
The relaxation of the parametric instability and electron heating of the magnetized plasma S.N.Gromov, L.L.Pasechnik, V.F.Semenyuk	322

Parametric instabilities in inhomogeneous plasma regions with different background fluctuations P.Heymann, H.Prinzler	323
Effective collision frequency in the presence of an ion sound wave parametrically, excited in Tonks-Dättner resonance Shunjiro Ikezawa, Takayoshi Okuda	324
Second Harmonic generation in the presence of Langmuir condensation K.Kamilov, F.Kh.Khakimov, V.N.Tsyтович	325
Nonlinear wave interaction in plasmas Nguyen the Hung	326
II.3.c Turbulence, turbulent transport	327
Turbulent heating of the ions by lower hybrid fields I.S.Baikov	327
Spectral density of ion acoustic plasma waves D.B.Ilić, K.J.Harker, F.W.Crawford	328
Anomalous diffusion and turbulence in high-beta plasmas penetrating magnetic fields David W.Koopman	329
Observation of temporal behaviour of ion wave turbulence by microwave scattering Atsushi Mase, Takashige Tsukishima	330
Fast particles scattering on MHD plasma oscillations and plasma turbulent reactor power law spectrum Yu.Nikolaev, V.N.Tsyтович	331
Computer simulation of a two-dimensional Langmuir turbulence A.N.Polyudov, Yu.S.Sigov	332
Conversion and stabilization of parametric instabilities by frequency shift P.K.Shukla, M.Y.Yu, K.H.Spatschek	333
II.4 LASER CREATED PLASMAS, DENSE PLASMAS, R.E.B.	335
Target influence on TEA-CO ₂ laser produced plasmas in air at atmospheric pressure I.Apostol, D.Drăgulescu, C.Grigoriu, I.N.Mihăilescu, I.Morjan Al.Nitoi, I.M.Popescu, M.Udrea	337

CO ₂ laser beam interaction with CD ₂ target V.Ā.Baranov, N.V.Borisov, D.D.Malyūta, V.G.Nizjev, G.V.Sholin	338
CO ₂ laser heating of the plasma behind a reflected shock wave S.J.C.Box, W.W.Byszewski, P.K.John	339
Angular radiance distribution of laser impulse in optically dense plasma A.V.Byalko	340
X ray emission from aluminium laser produced plasma J.C.Couturaud, C.Faure, J.L.Rocchiccioli	341
The formation of virtual cathodes with relativistic electron beams P.C.de Jagher, H.J.Hopman, B.Jurgens	342
Laser driven detonation waves above a solid target D.C.Emmony	343
Laser induced multiquantum electron free-free transitions L.Friedland	344
Self phase modulation in the breakdown of gases by ultra short light pulses J.C.Griesemann, M.Decroisette	345
Electrostatic trap for ions from a laser-initiated plasma J.L.Hirshfield, Michael S.Mussetto, P.Avivi	346
Some reflections on the focusing of intense charged particle beams H.J.Hopman, A.J.H.Boerboom, H.H.Tuithof	347
Strong magnetic field effect upon x-ray radiation of laser-produced plasma C.D.Kaitmazov, P.P.Pashinin, A.M.Prokhorov, E.I.Shklovsky	348
Investigation of spatial density distribution in laser plasma at flux densities of $10^{14} + 10^{15}$ W/cm ² O.N.Krokhin, Yu.A.Mikhailov, A.A.Rupasov, G.V.Sklizkov, A.S.Shikanov, Yu.A.Zakharenkov, N.N.Zorev	349
Ion and x ray emissions form nanosecond CO ₂ laser created plasma J.Martineau, P.Paranthoen, M.Rabeau	350
Plasma cluster acceleration by means of external magnetic field J.Kracík, J.Maloch, K.Šobra	351
Dense strongly non-ideal plasma generation by laser isobaric heating P.P.Kulik, E.K.Rozanov, V.A.Riabii, M.A.Titov	352

The plasma focus - a radial trajectory computation S.Lee, Y.H.Chen	353
Absorption and backscattering of CO ₂ laser radiation in a plasma column R.Massey, Z.A.Pietrzyk, H.Rutkowski, G.C.Vlases	354
Dynamical behavior of a laser induced plasma expanding into vacuum and gas Takayoshi Okuda, Jun Yamada, Toshihiko Yamauchi, Michio Asai	355
Validity of the effective-photon concept in laserinduced gas ionization phenomena E.Panarella	356
Magnetic fields produced in laser irradiated targets with composition gradient S.Poberaj	357
Mechanism of laser beam reentry into a laser breakdown plasma P.Savic, M.M.Kekez, A.H.Makomaski	358
II.5 RADIATION, DIAGNOSTICS	359
II.5.a Scattering	361
A new laser scattering technique permitting the registration of the total scattered spectrum during one shot J.Kopainsky	361
Effect of electron-neutral collisions on the satellites of the Thomson scattering spectrum in arc plasmas J.Kopainsky, F.Vilsmeier	362
Propagation and attenuation of sound waves as well as spectrally resolved Rayleigh scattering in weakly ionized plasmas J.Kopainsky	363
The concentration and effective charge of impurities in plasmas by laser radiation scattering D.E.Evans, S.A.Hamadto	364
Observation of enhanced microwave scattering at the upper hybrid frequency R.Cano, I.Fidone, J.T.Mendonça, B.Zanfagna	365
Sub-millimetre lasers for collective scattering in long debye length plasmas D.E.Evans, B.W.James, W.A.Peebles, L.E.Sharp	366

II.5.b Radiation, optical measurements	367
Measurement of stark broadening and shift of the helium I line $\lambda = 4922 \text{ \AA}$ and its forbidden components C.S.Diatta, A.Czernichowski, J.Chapelle	367
Stark broadening and shift parameters of sodium and potassium resonant lines J.Purić, J.Labat, S.Djeniže, Lj.Ćirković	368
Stark broadening of OII and OIII lines M.Platiša, M.Popović, N.Konjević	369
Experimental widths and shifts for ionized silicon lines A.Lesage, M.H.Miller	370
On the deduction of turbulent field parameters from the profile of forbidden helium spectral lines W.R.Rutgers	371
Influence of boundary layer on H_{α} and H_{β} line shape M.Pavlov, V.Radujkov, M.Platiša, M.Popović	372
Determination of plasma electron density by absorption of CO_2 laser radiation V.S.Golubev, V.A.Zhdanovskii, L.I.Kiselevskii, V.N.Snopko	373
Determination of the electron density from VUV absorption measurements B.F.M.Pots, B.van der Sijde, D.C.Schram	374
Radiation measurements for a cylindrical symmetric inhomogeneous plasma C.J.Timmermans	375
Spectral line radiation of perturbed argon and helium plasma J.Labat, S.Djeniže, J.Purić, Lj.Ćirković	376
Radiation loss calculations for dense non-thermal plasmas containing heavy ions B.A.Norton, E.R.Wooding	377
Radiative properties of dense plasmas produced in flashtubes filled with argon and xenon J.F.Genat, M.M.Popović, M.Skowronek	378
Investigation of the continuum radiation from an high pressure argon arc J.Glasser, J.Chapelle	379

Measurement of the argon continuum radiation in the near VUV K.Behringer, P.Thoma	380
On the resonance line shape measurements in axially symmetric plasma source S.Popović, N.Konjević	381
II.5.c Diagnostic methods	382
Determination of electron energy distribution by means of a cylindrical probe D.Stachórska, Z.Wroński	382
Experimental study of ion collection by a cylindrical Langmuir probe in a transitional regime T.Kopiczyński, Z.Zakrzewski	383
Application of regularization algorithms for calculation of electron energy distribution function in plasma of gas discharge L.M.Volkova, A.M.Devyatov, E.A.Kralkina, M.A.Sherif	384
Influence of the amplitude of the superimposed potential oscillations on probe measurements of the electron distribution function A.B.Blagoev, Ju.M.Kagan, N.B.Kolokolov, R.I.Ljaguschenko, M.A.Petrunkin, P.M.Pramatarov	385
Ion cyclotron radius resonance detected with asymmetrical double probes G.Peter, H.Rybarsch	386
A new method for determining the plasma density by RF twin probe Masanori Akazaki, Hiroharu Fujita	387
Measurement of local plasma diamagnetism by a compensated multiple magnetic probe array P.G.Carolan, M.Korten, F.Sand, G.Waidmann	388
Microwave correlations for inhomogeneous plasma positive column in waveguide A.P.Benedetti, G.Cicconi, V.Molinari, C.Rosatelli	389
Refraction techniques applied to multifrequency submillimeter diagnostics of the moving UHF discharge E.A.Tishchenko, V.G.Zatsepin, V.V.Zavyalov	390

xxxvi

An optical method for determining electron and atom density gradients applied to the shock reflection problem in a shock tube A.C.B.Hutten Mansfeld, E.J.M.van Heesch, M.E.H.van Dongen G.Vossers	391
Laser heterodyne measurement of refractive index behind a shock front in an electromagnetic shock tube H.Drymael, L.Rybowski, H.Zaccai	392
On the electron density distribution measurements in inhomogeneous plasma column E.F.Gippius, B.I.Iljuckhin, V.N.Kolesnikov, V.K.Fomin, L.I.Shoonskaya	393
Space and time resolved measurements in magnetically confined plasmas using a heavy ion beam probe W.C.Jennings, R.L.Hickok	394
Plasma diagnostics with combined laser and atom beams Kaare J.Nygaard	395
Dependence of plasma capacitor parameters on frequency V.I.Molotkov, L.P.Poberezhsky	396
Electrical conductivity of a fully ionized plasma in a magnetic field B.Vaucher, J.Vaclavik, H.Schneider	397

Session II.4 is mainly devoted to laser created plasmas and laser plasma interaction. There are two papers predominantly on dense plasmas (351, 353) and two papers on Relativistic Electron Beams (342, 347).