

C O N T E N T S

Page

S E S S I O N 1-2-P

(Invited papers)

- | | |
|--|---|
| 1. J. B. Hasted. Current problems in the experimental study of electronic and atomic collisions (<i>title only</i>) | 1 |
| 2. I. N. Golovin, G. A. Kasabov, V. I. Kogan, B. M. Smirnov. Gross section measurement needed for the development of studies on controlled fusion, MHD-generators and some other plasma applications (<i>title only</i>) | 1 |
| 3. L. M. Branscomb. Laboratory astrophysics (<i>title only</i>) | 1 |

S E S S I O N 1-3

Atomic collisions.

Electron capture into excited states

- | | |
|--|----|
| 1. J. R. Hiskes. Excited state population distributions produced by proton charge exchange collisions with ground state atoms | 2 |
| 2. J. G. Lodge, R. M. May. Formation of highly excited hydrogen atoms by charge exchange in lithium and sodium | 4 |
| 3. E. S. Solovyov, R. N. Il'lin, V. A. Oparin, N. V. Fedorenko. The formation of highly excited hydrogen molecules and atoms in the passage of fast H^+ , H_2^+ and H_3^+ ions through gases and metal vapours | 6 |
| 4. G. F. Drukarev. The position of the maximum of the atom-ion inelastic collision cross section | 10 |
| 5. A. H. Futch, K. G. Moses. Formation of excited hydrogen atoms by charge exchange collisions in magnesium vapour | 12 |
| 6. A. C. Riviere. The yield of excited atoms and molecules from the break-up of H_2^+ ions in magnesium vapour | 15 |
| 7. C. F. Barnett, J. A. Ray, R. A. Langley, A. Russel. Rydberg states of hydrogen molecules | 17 |
| 8. R. Nieman, K. Lulla, T. M. Donahue. Charge exchange of H^+ and H with K between 5 and 30 keV | 18 |

S E S S I O N 1-(3)

General theory. Faddeev equations

- | | |
|---|----|
| 1. L. D. Faddeev. Theory of scattering for three-body system (<i>invited paper, title only</i>) | 20 |
| 2. J. S. Ball, J. C. Y. Chen, D. Y. Wong. Application of the Faddeev equation to three-particle atomic systems | 20 |
| 3. A. M. Veselova. Application of three-particle theory to the elastic scattering of electrons by the hydrogen atom | 22 |
| 4. R. Carroll, A. Salin. Theory of charge transfer in high energy collisions | 23 |
| 5. B. A. Lippmann. An integral equation for multi-channel collisions | 26 |
| 6. A. Ya. Temkin. Use of the «cluster» concept for approximate treatment of atomic collisions | 29 |
| 7. D. Gelman, L. Spruch. Feynman path integrals and scattering lengths | 31 |
| 8. V. N. Savchenko. Relativistic radial equation in the theory of collisions of atoms with electrons | 32 |

Electronic collisions.

Ion excitation and ionization. Ionization of atoms

1. A. C. H. Smith, D. F. Dance, M. F. A. Harrison, R. D. Rundell. A measurement of the cross section for proton production in collisions between electrons and H_2^+ ions	35
2. R. D. Rundell, M. F. A. Harrison, D. F. Dance. A measurement of the cross section for detachment of electrons from H^- by electron impact	36
3. G. C. Tisonne, L. M. Branscomb. Detachment of an electron from the O^- ion by electron impact	39
4. F. M. Bacon, J. W. Hooper. Relative experimental cross sections for excitation of Ba^+ ions by electron impact	41
5. J. B. Wareing, K. Dolder. Measurement of cross sections for the ionization of Li^+ to Li^{2+} by electron impact	43
6. A. M. Emelyanov, Yu. S. Khodeev, L. N. Gorokhov. Electron impact ionization of Cs^+ ions	46
7. C. B. Lucas. Electron impact excitation of helium ions to the third principal quantum state	48
8. F. Fiquet-Fayard, J. P. Ziesel. Single and multiple ionization of Mg, Ca, Sr, and Ba by electron impact from 5 to 2000 eV	51
9. C. E. Brion, G. E. Thomas. The cross section for the ionization of helium by «mono-energetic» electrons	53
10. V. Srinivasan, J. A. Rees, J. D. Craggs. Measurements of the total ionization cross section for electrons in krypton and nitrogen	56
11. L. Vriens, T. F. M. Bonnen, H. Wallinga, J. M. Fluit. Measurement of cross sections for ionization of metastable atoms by electrons	58
12. S. I. Pavlov, W. I. Rakovsky, A. M. Stepanov, G. M. Fedorova. The measurement of the electron impact ionization cross sections of substances with low vapour pressure	60

Atomic collisions.

Excitation and charge transfer. Impact parameter method

1. L. Willets. The utility and validity of the impact parameter method (<i>invited paper, title only</i>)	62
2. L. Willets, S. J. Wallace. Complete quantum description of atomic collisions	62
3. D. F. Gallagher, L. Willets. Coupled state calculations of proton-hydrogen scattering in the Sturmian representation	65
4. I. M. Cheshire, E. C. Sullivan. Excitation of atomic hydrogen by fast protons	68
5. I. A. Poluektov, L. P. Presnyakov. On charge transfer into an excited state	71
6. J. P. Coleman. The impulse approximation for excitation	74
7. J. P. Coleman, S. Trelease. Electron capture into excited states in the impulse approximation	76
8. J. W. R. Fennema. On the impact of protons upon hydrogen atoms	78
9. R. K. Janev. Two-electron capture in non-resonant heavy particle collisions	82
10. D. Basu, D. M. Bhattacharya, G. Chatterjee. Electron capture by α -particle incident on hydrogen atom	84
11. N. C. Sil, D. P. Surali, S. C. Mukherjee. Charge transfer in He^+-He collision	86

Atomic collisions.

Inelastic energy loss in interaction of many-electron atoms

1. V. V. Afrosimov, Yu. S. Gordiev, A. M. Polyansky, A. P. Shergin. Correlation between final charge states of colliding atomic particles	89
2. E. Everhart. Coincidence measurements of Q-structure and fast electron emission in atomic collisions	91

3. Q. C. Kessel. Coincidence measurements of the average inelastic energy loss in Ne^+ on Ar collisions	92
4. A. Russel. The statistical theory of multiple ionization following high energy atomic collisions	94
5. W. F. v. d. Wege, C. Snoek, D. J. Bierman, J. Kistemaker. The energy spectrum of electrons arising from 100 keV Ar^+ on Ar collisions	95
6. M. Ya. Amusia. On the many-body effects in atomic electron shells	97
7. L. M. Kishinevsky, E. S. Parilis. Auger ionization in atomic collisions	100
8. G. N. Ogurtsov, S. V. Avakyan, I. P. Flaks. Energy distribution of electrons ejected in the collisions of singly- and doubly-charged ions with gas atoms	102

SESSION 2-(1)

Bounds on effective cross sections. Positron scattering. Positronium formation (Theory)

1. L. Spruch. Limits of cross sections (<i>invited paper, title only</i>)	104
2. F. H. Gertler, H. B. Snodgrass, L. Spruch. On the number of bound states of a system	104
3. R. J. Drachman. Variational bounds for elastic positron-atom scattering	106
4. L. Aspinwall, I. C. Percival. Bounds on transition probabilities for heavy particle collisions	109
5. M. Kraidy, P. A. Fraser. Scattering of positrons by helium and the rate of positron annihilation in helium	110
6. A. H. Moussa, H. S. W. Massey, K. Smith, C. Wardle. Positron-helium scattering with correlation	113
7. A. H. Moussa. Variational calculations of electron and positron scattering by helium	116
8. S. K. Houston, B. L. Moiseiwitsch. Elastic scattering of positrons by hydrogen and helium atoms	118
9. B. H. Bransden, Z. Jundi. Rearrangement collisions and positronium formation by positron impact	119
10. M. F. Fels, M. H. Middleman. Positronium formation in positron-hydrogen scattering	120
11. I. C. Percival, N. Valentine. Positronium formation in high energy $e^+ - \text{H}$ collisions	121

SESSION 2-2

Inner shell excitation and ionization

1. U. Fano. Ionization of inner shells of atoms (<i>invited paper, title only</i>)	123
2. D. L. Ederer. Resonance profiles of photoexcited inner subshell electrons in the noble gases	123
3. L. Lipsky, J. W. Cooper. Photoionization of neon and argon including inner shell excitations	126
4. V. Afrosimov, Yu. S. Gordiev, V. M. Lavrov, S. G. Schmelinin. An analysis of inelastic scattering of fast electrons in gases	127
5. M. Ya. Amusia, N. A. Cherepkov, S. I. Sheftel. On the mechanism of inelastic scattering of keV-electrons on atoms	130
6. T. M. Zimkina, V. A. Fomichev, I. I. Zhukova, S. A. Grivobovskiy. Photoionization absorption of the rare-earth elements in the 50-500 eV energy range	132
7. A. K. Edwards, M. E. Rudd. Autoionizing levels of neon	134

SESSION 2-(2)

Electron scattering. Long range forces (Theory)

1. J. Callaway, W. M. Duaxler, R. W. LaBahn, R. T. Pu. The polarized orbital method with application to elastic electron scattering by hydrogen and helium	137
2. R. T. Pu, W. M. Duaxler, R. LaBahn. Modified optical potential approach to low energy elastic $e-\text{Ne}$ and $e-\text{Ar}$ scattering	139

3. C. J. Kleinman, Y. Hahn, L. Spruch. Non-adiabatic contributions to long-range electron-atom interactions	140
4. W. R. Garrett. Non-adiabatic target distortion in low-energy atomic scattering	142
5. M. R. C. McDowell, D. Lloyd. Applications of the method of polarized orbitals	143
6. R. J. W. Henry. Polarization in low-energy electron scattering; oxygen	145
7. A. Temkin, K. Vasavada. The scattering of electrons from H_2^+	147
8. R. W. B. Ardill, W. D. Davison. The scattering of slow electrons by hydrogen molecules	150
9. K. Takayanagi, Y. Itikawa. Scattering of slow electrons by polar molecules	151
10. R. Subramanian. Application of the method of potentials of small radius to the problem of scattering of electrons by molecules	154
11. R. Oppenheim-Bergner, H. B. Snodgrass, L. Spruch. Tables of the coefficients which determine the long range contributions to electron-atom scattering	155

SESSION 3-1

Atomic collisions.

Methods of measuring charge transfer and ion-ion recombination cross sections
(superimposed beam technique etc.)

1. V. A. Belyaev, B. G. Brezhnev, E. M. Erastov. Measurements of the resonance charge exchange cross sections by the method of overtaking beams	156
2. R. Neynaber, S. M. Trujillo, E. W. Rothe. Merging beams study of symmetric resonance charge transfer in argon	158
3. F. Brouillard, J. M. Delfosse. A method of measuring ion-ion exchange cross sections using coincidence technique	159
4. W. Aberth, J. R. Peterson, D. C. Lorents, C. J. Cook. Measurement of ion-ion neutralization cross sections using the superimposed beam technique	162
5. G. Hagen. Measurement of dissociative recombination cross sections by ion beam techniques	165
6. I. Opauszky, L. Matus, M. J. Henchman. Determination of the cross section for symmetric charge transfer proceeding through orbiting collisions at energies of ~ 1 eV	167
7. H. Heil, B. W. Scott. Apparatus for measuring the resonant charge exchange cross section for energies between above thermal and 10 eV	170

SESSION 3-(1)

Atomic collisions. Peculiarities of angular distribution
(Theory)

1. F. J. Smith. Analysis of $Ar^+ - Ar$ differential cross sections	175
2. F. J. Smith. Oscillations in the exchange cross sections due to scattering from the central core	177
3. R. P. Marchi, F. T. Smith. Theoretical study of elastic perturbations	180
4. F. T. Smith. Potentials for $He^+ + Ar$ and $He^+ + Ne$ deduced from elastic scattering data	181
5. E. I. Dashen'skaya, E. E. Nikitin. Transitions between fine-structure components of alkali atoms in adiabatic collisions	183
6. Yu. N. Demkov. Elastic and inelastic collisions between atoms and ions with identical nuclei	185
7. Yu. N. Demkov, G. V. Dubrovskiy, A. M. Ermolaev. Transitions between degenerated states of the united atoms in the close collisions	186
8. G. V. Dubrovskiy. Resonant scattering of heavy particles in the quasi-classical approximation	187
9. M. Kunicki. Hypergeometric models for calculation of probabilities of non-adiabatic transitions	189
10. F. A. Wolf, B. R. Turner. The effect of polarization on charge transfer cross sections in the low eV region	191
11. V. K. Bykovsky. Contribution to the calculation of atomic reaction rates: the many-channel semiclassical approach	195

12. E. A. Andreev, V. K. Bykhoversky. The formation of metastable molecules in slow atom collisions. Elastic scattering of helium atoms	197
13. E. S. Binger, V. K. Bykhoversky. The formation of the metastable molecules in slow atom collisions. Two-electron channel processes	198
14. M. I. Fainingold, L. G. Yakovlev. The spiral scattering of ions and atoms	199
15. L. G. Yakovlev. Application of the optical model of scattering to the calculations of atomic collisions	200

S E S S I O N 3-2**Atomic collisions. Ionization**

1. A. B. Wittkower, G. Levy, H. B. Gilbody. Capture and loss involving fast helium beams — the effect of a metastable atom component	202
2. A. B. Wittkower, G. Levy, H. B. Gilbody. An experimental study of electron loss during the passage of fast hydrogen atoms through atomic hydrogen	205
3. D. W. Martin, L. J. Puckett, G. O. Taylor. Analysis of the recoil ions produced by fast protons	207
4. V. V. Afrosimov, Yu. A. Mamayev, M. N. Panov, N. V. Fedorenko. Coincidence measurements of the cross sections of elementary processes in collisions of H^+ , H^0 and H^- with the atoms of noble gases	210
5. J. F. Frichtenecht, J. C. Slattery, D. O. Hansen. Ionization probabilities for iron atoms incident on various gas targets	212
6. N. G. Utterback. Total cross sections for production of negative charge in ionizing collisions between molecules	216
7. N. G. Utterback. Atom exchange in ionizing collisions between nitrogen molecules	217
8. Yu. F. Bydin. The energy spectrum of electrons released in collisions of negative halogen ions with the atoms of inert gases	218
9. Yu. F. Bydin, V. I. Ogurtsov. Energy spectrum of electrons released in collisions of fast K atoms with inert gases	220
10. H. Fetz, H. Bumann. Electron production by collisions between neutral particles with energies up to 1000 eV	222
11. R. C. Amme, P. O. Haugjaa. Low energy ionization cross sections for Ne—Ne and Kr—Kr collisions	224

S E S S I O N 3-(2)**Ion-molecule reactions
(Theory)**

1. E. E. Nikitin, M. Ya. Ovchinnikova. Scattering and depolarization of a system in the $j=1$ state	226
2. Yu. N. Demkov, V. N. Rebane, T. K. Rebane. The adiabatic approximation for the description of reorientation of the atomic angular momenta under collisions	228
3. V. N. Rebane. Collisional depolarization of resonance fluorescence	229
4. J. L. Kinsey, E. K. Parks, J. W. Rieth, J. S. Waugh. Low energy He—H ₂ collisions and the anisotropic part of the He—H ₂ potential	231
5. G. A. Victor, A. Dalgarno. Anisotropies of long range intermolecular forces and rotational excitation	232
6. B. V. Kuksenko, S. A. Losev. On the vibrational excitation of rotating molecules	233
7. Don Secrest, B. R. Johnson. A theoretical quantum calculation of the collision of a helium atom with a hydrogen molecule	235
8. E. Bauer. Quenching of the resonance radiation of sodium by molecular nitrogen	236
9. A. Bjerrum. Electronic-vibrational transitions upon collisions of sodium atoms with nitrogen molecules	238
10. G. K. Ivanov, Yu. S. Sayasov. The theory of direct atomic-molecular or ionic-molecular reactions	238
11. A. A. Perov, S. E. Kupriyanov. $1S\sigma_g - 2p\sigma_u$ transition in the hydrogen molecular ion induced by collision with neon atoms	241

SESSION 3-3

Ion-molecule reactions
(Experiment)

Page

1. Z. Hermann, T. L. Rose, J. D. Kerstetter, R. Wolfgang.	Crossed-beam study of a simple ion-molecule reaction in the energy range 0.70-25 eV	243
2. Sh. Datz, T. W. Schmidt.	A crossed molecular beam study of the reaction of atomic deuterium with bromine	247
3. H. P. Brooidea, J. L. Dunn.	Measured room temperature reaction rates of metastable and ionic helium with several molecules	249
4. T. M. Miller, J. T. Moseley, D. W. Martin, E. W. McDaniel.	Measurement of the thermal reaction rate coefficient for $H_3^+ + 2H_2 \rightarrow H_3^+ + H_2$	251
5. E. Greene, L. Hoffmann, M. W. Lee, J. Ross.	Scattering of alkali metals by a series of reactive and non-reactive compounds in crossed molecular beams	254
6. M. Durup, J. Durup.	On atomic and diatomic ion-neutral reactive collisions at low energy	255
7. N. N. Tunitsky.	On collisions of the simplest ions and molecules	256
8. R. W. Rozett, W. S. Koski.	Hydrogen-helium ion-neutral reactions	257
9. J. F. Paulson, E. Murad, F. Dale.	Ion-neutral reactions studied by a double mass spectrometer	260

SESSION 3-(3)

Electron scattering. Resonances
(Theory)

1. A. Herzenberg, H. S. M. Lau.	Structure in $e-He$ scattering at energies of a few eV	261
2. R. H. Bullis, T. L. Churchill, W. J. Wiegand, E. K. Schubert.	Beam measurements of the structure in the electron-helium total elastic scattering cross section at energies below 2.0 eV	263
3. A. Herzenberg.	The total cross section in resonant electron scattering by molecules	264
4. F. H. Mies.	Effects of overlapping resonance widths on the scattering of electrons by diatomic molecules	265
5. J. N. Bardsley, F. Mandl, A. R. Wood.	The structure of the 2.3 eV N_2^- resonance	267
6. A. K. Bhatia, A. Temkin.	Further P -wave calculations of autoionization states of Ne and H^-	270
7. J. C. Y. Chen, M. Rotenberg.	Stationary variation-perturbation method for isolated compound states	271
8. T. Ohmura.	Decaying state and resonance scattering	274
9. I. Aronson, Y. Hahn, P. M. Henry, C. J. Kleinman, L. Spruch.	Determination of the Green's function and of the operator whose eigenvalues are the resonance energies	276
10. V. S. Rudakov.	Variational principles for the quasistationary states in the potential scattering	278
11. V. V. Kutchinsky, V. S. Rudakov.	Variational calculations of low-lying resonances of $(H+e)$ and (He^++e)	278

SESSION 4-1-P

(Invited papers)

1. T. M. Donahue.	Collisional processes relevant to aeronomy (<i>title only</i>)	279
2. W. R. Bennett.	Mechanism of generation in argon ion lasers (<i>title only</i>)	279
3. N. N. Sobolev.	Mechanism of generation in CO_2 high intensity gas lasers (<i>title only</i>)	279

SESSION 4-2

Atomic collisions. Excitation

1. S. Dworetsky, R. Novick, W. W. Smith, N. Tolok.	Failure of the adiabatic criterion; structure and coherence in the low energy excitation of helium atoms by helium ions	280
--	---	-----

2. F. J. de Heer, D. Jaeks, A. Saloop, L. Wolterbeek Muller, B. F. J. Luyken. Excitation of Ne, Ar, Kr and Xe by He^+ impact (0.3—35 keV)	283
3. E. W. Thomas, G. D. Bent, J. L. Edwards. The excitation of molecular nitrogen and oxygen by the impact of 0.15 to 10 MeV protons	286
4. J. L. Edwards, E. W. Thomas. Balmer emissions from a molecular hydrogen target induced by the impact of fast protons	288
5. J. M. Robinson, H. B. Gilbod. Excitation of helium, nitrogen and nitric oxide by 60—400 keV protons	291
6. D. A. Dahlberg, D. K. Anderson, I. E. Dayton. Excitation of N_2 and N by proton and hydrogen-atom impact	294
7. M. Dufay, J. P. Buchet, M. Carre, A. Denis, J. Desesquelles, M. Gaillard. On the excitation of rare gases by impact of ac- celerated ions	295
8. M. Dufay, J. Desesquelles, M. Carre, G. DoCao, M. Drueutta, M. Eidelberg, M. C. Poulizac. On the exci- tation of some polyatomic gases by impact of accelerated ions	297
9. S. N. Ghosh, Y. Sahai, K. K. Bhutani, Excitation processes in N_2 , Ar, air and O_2 by low energy proton impact	300
10. E. P. Andreev, V. A. Ankudinov, S. V. Bobashov, V. M. Dukelski, V. B. Matveev. Lyman beta radiation pro- duced by proton-inert gas collisions: influence of electric field on its in- tensity	302
11. V. A. Ankudinov, E. P. Andreev, S. V. Bobashov. Disso- ciation of H_2 molecules by He^+ impact with excitation of hydrogen atoms into 3s-, 3p-, and 3d-states	304
12. E. P. Andreev, V. A. Ankudinov, S. V. Bobashov. Cross sections for electron capture by protons to 3s-, 3p-, 3d-states of the hydro- gen atom	307
13. E. P. Andreev, V. A. Ankudinov, S. V. Bobashov. Excita- tion of hydrogen Lyman alpha and beta lines by H^+ , H_2^+ and He^+ ions pas- sing through hydrogen	309
14. V. A. Ankudinov, E. P. Andreev, A. L. Orbeli. Excitation of L_α radiation in collisions of fast hydrogen atoms with inert gases	312
15. T. D. Gaily, R. Geballe. Polarization on Lyman alpha radiation from H^+ - and D^+ -rare gas charge transfer collisions	314
16. M. G. Belanger, R. L. Gray, D. Krause, E. A. Soltysik. Polarization of light resulting from the excitation of helium by protons and H atoms	318

SESSION 4-(2)

Dissociative recombination and similar processes
(Theory)

1. A. Herzenberg. The theory of electron detachment in slow collisions between atoms and negative ions	322
2. Yu. N. Demkov. The detachment of electron in the slow collisions of atoms and ions	325
3. V. M. Borodin. The capture and energy exchange between an electron and atoms in three-body collisions	326
4. R. Z. Vitlina, A. V. Chaplik. On the theory of a negative ion forma- tion in the slow atomic collisions	327
5. A. S. Devdariany. Square appoximation for the problem of electron detachment in the collision of negative ion with atom	328
6. J. C. Y. Chen, M. H. Mittleman. The role of Rydberg states in dis- sociative recombination	329
7. J. C. Y. Chen. Resonant electron transfer in the (H, H^-) collision system at low energy	332
8. J. C. Y. Chen, J. L. Peacock. Numerical study of dissociative attach- ment and associative detachment	335
9. J. N. Bardsley. The theory of dissociative recombination	338
10. J. N. Bardsley. Electron detachment in $\text{H}-\text{H}^-$ collisions	340
11. G. V. Dubrovsky, V. D. Obedkov, R. K. Janev. The decay of two-atom molecules by collisions with electrons	342
12. P. J. Redmond. Theory of resonant dissociative recombination	346
13. T. F. O'Malley. Slow heavy particle collision theory based on crossing, quasi-adiabatic electronic states	348

SESSION 4-3

Collision processes in plasmas

Page

1. S. E. Frish, O. P. Bochkova. Determination of cross sections of exciting collisions with atoms on the basis of the discharge plasma properties investigation	352
2. A. D. Khakhaev, L. A. Luisova, V. S. Krivchenkova, S. L. Krylova. Stepwise excitation functions, parameters of quenching processes and transition probabilities of highly excited states of neon and argon	353
3. E. N. Pavlovskaya, I. V. Podmoshensky. The effectiveness of atomic collisions in excitation processes	356
4. E. K. Kraulinaya, A. E. Lezdin, O. S. Sametis. Collisions between excited mercury atoms and ground-state thallium atoms	358
5. G. A. Vesnichëva, N. P. Penkin, T. P. Red'ko. Cross sections for inelastic collisions of electrons with cadmium atoms	360
6. J. Bakos, J. Szigeti. Measurements of cross section for collision of second kind in helium	361
7. H.-J. Kunze, A. H. Gabriel, H. R. Grieß. Measurement of electron impact ionization and excitation rate coefficients for carbon V ions	362
8. R. L. Taylor, G. E. Caledonia. Experimental determination of cross sections for neutral bremsstrahlung in the noble gases (<i>title only</i>)	365
9. R. L. Taylor, G. E. Caledonia. Experimental determination of the cross sections for neutral bremsstrahlung for O, N and N ₂ (<i>title only</i>)	365
10. R. Deloche, B. Sayer, A. Gonfalone, J. Berlande, C. Mansus. Study of electron-ion recombination in a dense neutral helium plasma	365

SESSION 4-(3)

Electronic collisions. Close coupling approximation
(Theory)

1. P. G. Burke. Theoretical backgrounds and achievements of the close coupling approximation (<i>invited paper, title only</i>)	368
2. P. G. Burke, A. J. Taylor, S. Ormonde, W. Whitaker. Threshold behaviour of the n=2 excitation cross sections in atomic H	368
3. J. Macek, P. G. Burke. The effect of resonances on excitation in e-H scattering	372
4. P. G. Burke, A. J. Taylor, J. W. Cooper, S. Ormonde. The scattering of electrons by helium atoms	376
5. R. Marriott, M. Rotenberg. Low energy electron scattering by lithium	379
6. D. L. Moores. Autoionizing states in the alkaline earth atoms	383
7. L. A. Conway, S. Ormonde, K. Smith. Scattering of electrons by complex atoms	386
8. J. W. Cooper. Time delay matrix for electron scattering in the vicinity of the n=2 thresholds of He	387
9. R. Peterkop. Elastic scattering of electrons by helium atoms	391
10. R. Damberg, E. Karule. A modification of the close-coupling approximation for e-H scattering allowing for the long-range interactions	392
11. L. Rabik. The effect of «negative ion» configurations in electron-atom collisions	394
12. A. V. Lyash, A. B. Bolotin. Extended method and many-configuration approximation in the theory of electron-atom collisions	397

SESSION 4-4

Atomic collisions.

Charge transfer. Electron capture and loss at high energies

1. J. Perel, A. Y. Yahiku. Oscillations in total cross sections of Rb ⁺ , K ⁺ , Na ⁺ and K charge transfer	400
2. G. D. Alam, D. K. Bohme, J. B. Hasted, P. P. Ong. Charge transfer collisions involving curve-crossing	403
3. P. Mahadevan, C. D. Magnuson. Measurement of charge transfer cross sections for certain symmetric and asymmetric systems at low energy (from 1 to 100 eV)	405

	Page
4. B. Palyukh, L. Savchin. Charge exchange and mobility of K^+ in K and Cs^+ in Cs	408
5. D. W. Koopman. Charge exchange of H^+ and H_2^+ in atmospheric constituents	410
6. J. K. Layton. Charge transfer cross sections for ions of period V with Ar , N_2 and O_2	412
7. M. O. Krause, W. E. Hunt. Multiple charge transfer of multiply-charged xenon ions in neon, argon, krypton, and xenon	414
8. J. A. Rutherford, B. R. Turner. The production of NO_2^- by electron transfer from O^- , O_2^- , O_3^- and OH^- to NO_2	416
9. K. H. Berkner, S. N. Kaplan, R. V. Pyle, L. M. Welsh. Cross sections for electron capture by fast protons in H_2 , He , N_2 and Ar	418
10. R. T. Brackmann, Hsi-Hu Lo, W. L. Fite. Charge capture and loss cross sections of metal ions in gases	422
11. S. Datz, C. D. Moak, H. O. Lutz, L. C. Northcliffe, L. B. Bridwell. Electron capture and loss processes for fast (20–150 MeV) bromine and iodine ions in gases	425
12. P. H. Rose, F. Chmara, R. J. Van de Graaff, L. Grodzins, R. Kalish. The mean charge and energy loss of U , Ta , J and Br ions in solid and gas targets between 9 and 214 MeV	427
13. I. S. Dmitriev, V. S. Nikolaev, Ya. A. Terlova. A study of long-lived excited ions in the fast particle beam having passed through matter	429
14. V. V. Balashov, V. S. Senashenko, B. Teku. Lifetimes of the metastable states of lithium-like ions	432
15. L. I. Pivovarov, L. I. Nikolaychuk, F. M. Trubchaninov. Effect of the density and the aggregate state of the target on the charge composition of the ion beams of Li , Na and K	433

SESSION 4-(4)

Electronic collisions.
Excitation and ionization. Various
approximate calculations
(Theory)

1. L. A. Vainshtein. Some methods of calculation of the excitation of atoms by electron impact (<i>invited paper, title only</i>)	436
2. L. A. Vainshtein, L. P. Presnyakov. On the significance of the intermediate states in the processes of excitation of atoms by electron impact	436
3. I. L. Beigman, L. A. Vainshtein, A. V. Vinogradov. Double excitation of atoms by electron impact	438
4. K. Omidvar. Vainshtein method applied to electron impact excitation and ionization of atoms	440
5. H. L. Kyle, K. Omidvar. Excitation and ionization of $He^+(1s)$ by electron impact	444
6. G. Peach. A study of Vainshtein's approximation for the excitation and ionization of hydrogen by electron impact	446
7. M. Inokuti, Y.-K. Kim, R. L. Platzman. Sum rule for the Bethe inelastic scattering cross sections	448
8. V. Veldre , A. Liepin, E. Sorokina, M. Shkelye. Ionization of the atoms allowing for distortion of wave functions of the incident electrons	451
9. K. Omidvar, E. C. Sullivan. Ionization of many-electron atoms by electron collision	452
10. V. D. Obedkov. Optical model for the electron elastic collisions with atoms	456
11. J. M. Peek. Equivalence of a sudden approximation to the high energy limit of the first Born approximation	458
12. T. F. M. Bonsen, L. Vriend. The Bethe theory and the binary encounter collision model for ionization of the H atom from states with principal quantum number 2 by fast electrons	460
13. D. C. Cartwright, A. Kuppermann. Excitation of first two triplet states of hydrogen by low energy electrons	465

SESSION 5-1-P

(Invited papers)

Page

1. C. F. Barnett, L. J. Kieffer. Atomic collisions information centers in USA (<i>title only</i>)	467
2. E. Gerjuoy, Yu. N. Demkov, G. F. Drukarev. Theoretical aspects of atomic collisions (summary review) (<i>title only</i>)	467

SESSION 5-2

Atomic collisions. Inelastic scattering of ions

1. D. C. Lorents, W. Abert, D. Coffey, V. W. Hesterman. Differential excitation cross sections for collisions of He^+ with Ne and Ar	468
2. P. R. Jones, T. L. Batra, H. A. Rangan. Measurements of electron capture and excitation in Ne^+ - Ar and Ar^+ - Ne collisions	470
3. H. H. Fleischmann, R. A. Young. Small-angle scattering in charge-transfer collisions between He^+ and Ar at ion energies between 80 and 300 eV	472
4. P. G. Cable, K. W. Ogilvie, T. D. Wilkerson. Differential cross sections for hydrogen ion collisions with water molecules	474
5. V. V. Afrosimov, Yu. S. Gordeev, A. M. Polyansky, A. P. Shergin. Peculiarities of scattering in violent collisions of atomic particles	475
6. M. Abignoli, M. Barat, J. Baudoin, A. Pernot. A high resolution spectrometer for double differential cross section measurement (angle and energy) in ion-atom and ion-molecule scattering (100 eV-3 keV)	478

SESSION 5-(2)

Electronic collisions.
Excitation of atoms, I

1. H. Boersch, J. Geiger, B. Schröder. High resolution energy loss spectrum of helium	481
2. R. G. W. Keessing, D. W. O. Heddle. High resolution studies of threshold excitation in helium	484
3. H. Ehrlhardt, K. Willmann. Angular dependence of excitation functions measured by electron scattering from helium and N_2	486
4. H. R. Moustafa Moussa, F. J. de Heer, J. Schutten. Absolute excitation cross sections of electrons on helium (0.05-6 keV)	489
5. L. Vriens, F. J. de Heer, J. v. d. Bos, H. R. Moustafa Moussa. Excitation of helium by electrons and protons. A theoretical interpretation of new experimental results	491
6. A. Skerbele, E. N. Lassettre. The behaviour of relative cross sections and a test of the second Born approximation in helium excited by 48 V electrons	495
7. R. H. McFarland. Threshold electron-impact polarization and excitation measurements at low pressures for helium lines, 4686 Å and 4922 Å	498
8. I. S. Aleksakhin, I. P. Zapatoschny, O. B. Shpenik. Cross sections for excitation and ionization of electrons by lithium atoms by electron impact	499

SESSION 5-3

Collisions of excited atomic particles

1. W. Berdowski, L. Krause. Collisional disorientation of magnetically oriented $4^2P_{1/2}$ potassium atoms	502
2. D. A. McGillis, L. Krause. $4^2P_{1/2}$ - $4^2P_{3/2}$ mixing in potassium induced by collisions with N_2 , H_2 and HD	505
3. B. P. Kibble, G. Copley, L. Krause. The determination of collision cross sections for quenching of Na , radiation using a delayed coincidence method	508
4. P. L. Bender, D. R. Crosley, D. R. Palmer, R. N. Zare. Collisional mixing of alkali $nP_{1/2}$ and $nP_{3/2}$ levels	510
5. T. Hadeishi, Chung-Heng Liu. Exchange collisions between the ionic ground state and the neutral metastable state of atoms formed and aligned by electron impact	513

6. J. E. M e n t a l l, H. F. K r a u s e, W. L. F i t e. Transfer of energy from excited N ₂ to Na	515
7. R. M. S t. J o h n, J. D. J o b e. Collisional transfer of excitation among the <i>n</i> =4 states of helium	517
8. R. A. Y o u n g, G. B l a c k, G. A. S t. J o h n. Collision energy transfer between simple species	518
9. N. P. P e n k i n, L. N. S h a b a n o v a. Cross sections for the broadening of resonance lines of some atoms	519
10. M. L o m b a r d i. Study of the line-broadening by atom-atom impact and of the level population-mechanism by means of the excited levels alignment by high frequency discharge method (<i>title only</i>)	519
11. M. Ł u k a s z e w s k i. Study of dephasing collisions in optical pumping experiment	519
12. W. R. B e n n e t t, V. P. C h e b o t a y e v, J. W. K n u t s o n. Direct observation of hole-burning, Lorentz widths, and collision broadening using stimulated emission techniques	521
13. D. A. V a r s h a l o v i c h. Specific features in the behaviour of hydrogen atoms in the interstellar medium	522

S E S S I O N 5-(3)

Electronic collisions. Excitation of atoms, II

1. N. F e a u t r i e r, S. B r e c h o t, H. V a n R e g e m o r t e r. On electron impact broadening of ionized calcium and argon lines	525
2. V. A. A l e k s e y e v, M. A. M a z i n g, P. D. S e r a p i n a s, I. I. S o b e l m a n, L. A. V a i n s h t e i n. The evaluation of the effective scattering cross sections from the spectral line broadening	528
3. I. L. B e i g m a n, L. A. V a i n s h t e i n, A. P. D r o n o v, E. M. K u d r y a v t s e v, N. N. S o b o l e v. An experimental determination of cross sections for the excitation by electrons of transitions between excited levels Ba ⁺ (7s ² S-7p ² P) and Sr ⁺ (5D _{5/2} -5P _{3/2})	530
4. A. S. K h a i k i n. Measurement of the effective cross sections for electron collision-induced transitions within excited levels of neon	532
5. W. R. O t t, W. E. K a u p p i l a, W. L. F i t e. Polarization of Lyman- α excited in electron collisions with atomic hydrogen	534
6. H. G. M. H e i d e m a n. The polarization (near threshold) of spectral lines of mercury, excited by electrons	537
7. H. K l e i n p o p p e n. Electron impact and optical excitation of alkali resonance lines with the selection rule $\Delta m_l=0$	538
8. K. R u b i n, M. G o l d s t e i n, R. C o l l i n s, B. B e d e r s o n. Observation of change of spin orientation of potassium atoms in inelastic scattering by low energy electrons as a function of scattering angle	540

S E S S I O N 5-4

Experimental techniques

1. B. D o n n a l l y. On the possibility of producing polarized electrons from polarized metastable deuterium atoms	543
2. V. W. H u g h e s, M. S. L u b e l l, M. P o s n e r, W. R a i t h. Production of polarized electrons by pulsed photoionization of a polarized atomic beam of lithium-6	544
3. W. F r a n z e n. Electron polarization by resonance from rare gas atoms	545
4. W. H i l g n e r, J. K e s s l e r. Electron polarization by collision with simple molecules	546
5. W. E i t e l, K. J o s t, J. K e s s l e r. Further results on the polarization of slow electrons scattered by mercury atoms	549
6. D. M. J. C o m p t o n, R. F. M a t h i s, J. A. R u t h e r f o r d, B. R. T u r n e r. Determination of the abundance of excited ions in ion beams formed by electron impact ionization	550
7. R. N. V a r n e y. Production of metastable beams by charge exchange between ions and excited atoms	553
8. H. H a r t n a g e l. A collision experiment with a tubular electron beam for the study of higher order ions	555
9. C. K. C r a w f o r d. The multiple-crossed-beam technique for cross section measurements	556

	Page
10. D. Spence, K. Dolder. Production of intense pulsed beams of atomic oxygen	557
11. F. H. Read, R. E. Imhof. Electron-optical zoom lenses	559
12. J. A. Jordan, R. E. Yager, G. S. Bakken. Excitation of $n=4$ and $n=5$ states in HeII	560

S E S S I O N 5-(4)

Electronic collisions.
Excitation and ionization of molecules.
Dissociative attachment of electrons to molecules

1. J. Geiger, B. Schröder. Electron energy loss spectra of the nitrogen and oxygen molecule	563
2. J. W. McConkey, D. J. Burns, J. M. Wooldsey, F. R. Simpson. Absolute cross sections for electron impact excitation and ionization of atmospheric gases	565
3. G. N. Polyakova, Ya. M. Fogel, A. V. Zats. Rotational and vibrational energy level distributions of N_2^+ ions produced in ionization of N_2 molecules by electron impact	567
4. V. V. Skubennich, I. P. Zapatoschny. Spectroscopic investigation of excitation cross sections for molecular levels	570
5. S. E. Kupriyanov. Formation of long-lived highly excited states of molecules and atoms in collisions of electrons with deuterium and hydrogen molecules	571
6. M. Horani, S. Leach, J. Rostas. Optical spectroscopic studies of excitation, decomposition and ionization processes occurring through low energy electron collision with two series of triatomic gases	573
7. S. Lipsky, J. A. Simpson. Electron impact spectra of simple alkanes	575
8. G. J. Schulz, R. K. Asundi. Compound states in H_2 , HD, and D_2 , and the measurement of their lifetime	577
9. M. J. W. Boness, G. D. Hale, J. B. Hasted, I. Larkin. Energy levels derived from transmission of electrons	577
10. P. J. Chantry. Dissociative attachment in CO and NO	581
11. L. G. Christophorou, R. N. Compton, H. W. Dickson. Electron capture by hydrogen halides	582
12. L. Bouby, H. Abgrall. Attachment of thermal electrons to oxygen in the presence of various compounds as a third body	584
13. V. I. Khvostenko, A. Sh. Sultanov, I. I. Furley. On the formation of Cl^- ions resulting from dissociative attachment of electrons to CCl_4 molecules	586

S E S S I O N 6-1

Atomic collisions.
Dissociation of H_2^+ ions. Penning ionization

1. M. Vogler, W. Seibt, H. Ewald. Collision-induced dissociation of H_2^+ ions	587
2. R. Caudano, J. M. Delfosse. Energy distribution of protons produced by H_2^+ dissociation on gas targets	590
3. D. K. Gibson, J. Los, J. Schopman. Angular dependence of collision induced excitation of H_2^+ ions	594
4. T. Sindai, C. Manus, J. Guidin. Etude des interactions inélastiques entre deux faisceaux d'ions	597
5. T. A. Green, J. M. Peek. First Born approximation cross sections for the breakup of high energy H_2^+ ions upon collision with He	599
6. V. Čermák. Penning ionization electron spectroscopy	601
7. Z. Hermann, V. Čermák. Associative ionization between excited mercury atoms and polyatomic molecules. Formation of Hg_2^+	602
8. E. E. Mushlitz, J. R. Penton, J. A. Herce. Isotope effect in the ionization of hydrogen, deuterium and hydrogen deuteride on impact of metastable helium atoms	604

S E S S I O N 6-(1)

Photoionization, photodissociation

1. F. I. Vilesov, M. E. Akopyan, S. N. Loapatin, V. I. Kleymenov. Photoionization of atoms and simple molecules. Photoionization cross sections. Angular and energy distribution of photoelectrons	606
--	-----

	Page
2. J. Berkowitz, W. A. Chupka. High-resolution photoionization and mass analysis of small molecules	608
3. G. H. Dunn, F. von Busch, B. Van Zyl. Photodissociation of H_2^+ (D_2^+): theory and experiment	610
4. R. I. Schoen, P. H. Doolittle. Energies of electrons and ions released in photoionization	613
5. D. C. Frost. Ionization potentials and transition probabilities by photoelectron spectrometry	615
6. G. P. Startsev, M. G. Kozlov. The absorption cross section above the ionization limit and the oscillator strengths for Ga and In between 220 and 150 m μ	616
7. L. Lipsky. Angular distribution of photoelectrons	617
8. M. Connolly, L. Lipsky, K. Smith. Photoionization of atoms with configurations $1s^2 2s^2 2p^6 3s^2 3p^2$	619
9. F. R. Crownfield. Theory of the double photoelectric effect in helium using screened hydrogenic wave functions	621
10. G. F. Drukarev. Photodetachment of negative atomic ions in the ultraviolet region	623
11. M. C. Weinberg, R. S. Berry. Molecular photoionization and electron scattering from molecule-ions by a quantum defect method	624
12. S. P. Khare. Photoionization of hydrogen molecule	625
13. J. C. Y. Chen, N. F. Lane. Photoionization of molecules near the threshold	627

S E S S I O N 6-2

Atomic collisions. Elastic scattering

1. R. B. Bernstein. Reactive scattering of oriented molecules and velocity analysis of crossed beam reactions	631
2. J. Politiek, J. Los, A. P. M. Baede. Total cross section measurements for scattering of K atoms on rare gases in the thermal and high velocity range	632
3. J. E. Jordan, I. Amidur. An anomalous dynamic effect in the scattering of beams of fast argon atoms by hydrogen isotopes	634
4. H. H. Brown, E. Gray, B. Bederson. Velocity dependence of alkali atom-atom and atom-ion scattering total cross sections in thermal energy range	636
5. W. C. Swallow, A. Niehaus, D. R. Herschbach. Velocity dependence of total cross section for scattering of hydrogen atoms from mercury	639
6. R. K. B. Helbing, E. W. Rothe. Velocity dependence of total cross section for thermal energy atom-molecule scattering	642
7. Yu. N. Belyaev, V. B. Leonas, A. V. Seryagin. The study of the small energy atom-molecular interactions by means of the fast beams	643

S E S S I O N 6-(2)

Classical calculations of electronic and atomic collisions. Excitation, ionization, and charge transfer

1. A. Glassgold. Correlation of the outgoing electrons in electronic ionization	646
2. I. Vinkalns, M. Gailitis. The threshold behaviour of ionization cross sections	648
3. L. A. Vainshtein, A. V. Vinogradov. An impact parameter treatment of electron-atom excitation	650
4. J. D. Garcia, E. Gerjuoy, J. E. Welker. Classical calculations of charge transfer cross sections	651
5. J. D. Garcia, E. Gerjuoy, J. E. Welker. Classical approximation for ionization by heavy particle impact	653
6. J. D. Garcia, E. Gerjuoy. The correspondence principle in inelastic scattering	655
7. I. C. Percival, D. Richards. Classical theory of hydrogen atom excitation by electrons and protons	658
8. V. M. Dubner, N. V. Komarovskaya. On the classical approximation in the atomic collisions	659

Author index