

# **ILYA I. FABRIKANT**

Date of Birth: February 15, 1949  
Place of Birth: Riga, Latvia, USSR  
Married, 3 children

## **RESEARCH INTERESTS**

Atomic Physics  
Electron-Atom and Electron-Molecule Collisions  
Electron Attachment to Physisorbed Molecules  
Collisions of Rydberg Atoms with Neutral Atoms and Molecules  
Atomic Processes in External Fields; Negative Ion Decay

## **EDUCATION**

1971	M.S.	Latvian State University, Riga, Latvia, USSR (Theoretical Atomic Physics)
1974	Ph.D.	Institute of Physics, Riga, Latvia, USSR (Theoretical Atomic Physics)

## **PROFESSIONAL EXPERIENCE**

1974-1984	Junior Research Fellow, Institute of Physics, Riga, Latvia, USSR
1984-1988	Senior Research Fellow, Institute of Physics, Riga, Latvia, USSR
10/88-8/89	Visiting Scholar, James Franck Institute, University of Chicago
4/89-8/89	Visiting Scientist, Harvard-Smithsonian Center for Astrophysics
8/89-9/95	Associate Professor, University of Nebraska-Lincoln
9/95-present	Professor, University of Nebraska-Lincoln
7/96	Visiting Scientist, University of Sherbrooke, Quebec
9/97-12/97	Visiting Scientist, Harvard-Smithsonian Center for Astrophysics
7/98, 6/99-7/99, 6/00-7/00	Visiting Scientist, University of Kaiserslautern, Germany

## **MEMBERSHIP**

Executive Committee of the USSR Academy of Sciences on the Physics of Electronic and Atomic Collisions, 1988.  
American Physical Society, 1989-  
International Physics Group – American Physical Society 1989-  
American Physical Society Fellow, 1995

**GRANT SUPPORT**

“Atomic Processes Involving Negative Ions”  
(National Science Foundation)

Initial Grant	1990-92	\$84,989
Renewal Grant	1992-95	\$145,120
Renewal Grant	1995-98	\$180,000
Renewal Grant	1998-01	\$180,000
Renewal Grant	2001-03	\$210,000

**INVITED TALKS**

67 invited lectures, colloquia and seminars at universities and government laboratories in the U.S.A., USSR, France, Germany, Canada, and Japan.

**OTHER PROFESSIONAL ACTIVITIES**

NSF Reviewer and Panel Member

Japanese Society for Promotion of Science Travel Award, July-August 1999

European Conference on Elementary Processes in Atomic Systems, (July 2000), Organizing  
Committee Member

International Symposium on Electron-Molecule Collisions and Swarms (July 2001), Chair

2<sup>nd</sup> European Conference on Elementary Processes in Atomic Systems (September 2002),  
Scientific Committee Member

US-Japan Workshop on Resonances in Physics, Chemistry and Biology (December 2002), Co-Chair

International Symposium on Electron-Molecule Collisions and Swarms (July 2003), Scientific Committee  
Member

**INVITED TALKS MADE AT PROFESSIONAL MEETINGS**

1. COLLISIONS OF SLOW ELECTRONS WITH POLAR MOLECULES. IVth National School on the Physics of Electronic and Atomic Collisions, Moscow, 1977.
2. ROTATIONAL AND VIBRATIONAL EXCITATION OF POLAR MOLECULES BY ELECTRONS. National Seminar on Electron-Molecule Scattering, Leningrad, 1982.
3. COLLISIONS OF SLOW ELECTRONS WITH MOLECULES. IXth National Conference on the Physics of Electronic and Atomic Collisions, Riga 1984.
4. VIBRATIONAL EXCITATION OF MOLECULES BY ELECTRONS. VIth National School on the Physics of Electronic and Atomic Collisions, Signakhi, 1986.
5. DYNAMICS OF THE SPIN-EXCHANGE PROCESSES IN ALKALI-HELIUM PLASMA. National Seminar on the Optical Orientation of Atoms and Molecules, Leningrad, 1987.
6. NEAR-THRESHOLD PHOTODETACHMENT FROM H<sup>-</sup> IONS IN PARALLEL STATIC ELECTRIC AND MAGNETIC FIELDS. Workshop on Physics of H<sup>-</sup>, UNM, Albuquerque, 1990.

7. RESONANT THEORY OF DISSOCIATIVE ATTACHMENT. NATO Workshop “Dissociative Recombination, Theory, Experiment and Applications”, St. Jacut, 1992.
8. ADIABATIC COMPLEX-PLANE CALCULATIONS OF RYDBERG-STATE BROADENING. Workshop on Complex R-plane Techniques, Charlottesville, 1993.
9. TWO- AND THREE-BODY DYNAMICS GOVERNING COLLISIONS OF RYDBERG ATOMS WITH NEUTRAL TARGETS. 4th United States/Mexico Joint Symposium on Atomic and Molecular Physics, Mexico City, 1994.
10. ELECTRON DRIFT IN ALKALI-METAL VAPORS. Workshop on Electron Degradation Processes, Institute for Theoretical Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, 1995.
11. ELECTRON SCATTERING BY NEUTRAL TARGETS AT MILLI- AND SUBMILLI-ELECTRON-VOLT ENERGIES. 1995 Annual Meeting of the Atomic Physics Division of the American Physical Society, Toronto, 1995.
12. DISSOCIATIVE RECOMBINATION AND DISSOCIATIVE ATTACHMENT: SIMILARITIES AND DIFFERENCES. NATO Advanced Research Workshop “Dissociative Recombination: Theory, Experiment, and Applications”, Ein Gedi, 1995.
13. Los Alamos Atomic, Molecular and Optical Physics Summer School, 1996. Three invited lectures on electric-field effects in photodetachment.
14. DISSOCIATIVE ATTACHMENT TO METHYL CHLORIDE: FROM GAS PHASE TO SURFACE. International Symposium on Electron-Molecule Collisions and Ion and Electron Swarms, 1997, Engelberg, Switzerland.
15. THRESHOLD PHENOMENA IN INELASTIC ELECTRON-MOLECULE COLLISIONS. Workshop on Threshold Phenomena, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, June 8-12, 1998.
16. THRESHOLD LAWS IN LOW-DIMENSIONAL SYSTEMS, Workshop on Threshold Phenomena, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, June 8-12, 1998.
17. THEORETICAL CALCULATIONS OF DISSOCIATIVE ELECTRON ATTACHMENT. CECAM Workshop Electron-molecule Collision Data for Modeling and Simulation of Plasma Processing, Lyons, September 21-24, 1998.
18. STUDIES OF DISSOCIATIVE ATTACHMENT REACTIONS: FROM GAS PHASE TO CONDENSED PHASE, XXI International Conference on Physics of Electronic and Atomic Collisions. Sendai, Japan, July 22-27, 1999.
19. THEORETICAL STUDIES OF DISSOCIATIVE ATTACHMENT: FROM GAS PHASE TO CONDENSED PHASE, Europhysics Conference “Elementary Processes in Atomic Systems”, Uzhgorod, Ukraine, 25-28 July 2000.

20. THEORY OF ELECTRON-MOLECULE COLLISIONS IN THE SUB-MEV RANGE, Europhysics Conference “Elementary Processes in Atomic Systems”, Uzhgorod, Ukraine, 25-28 July 2000.
21. RESONANCED PROCESSES IN e-H<sub>2</sub>/HD/D<sub>2</sub> COLLISIONS: DISSOCIATIVE ATTACHMENT AND DISSOCIATION FROM VIBRATIONALLY EXCITED STATES. Workshop on Molecule Assisted Recombination and Other Processes in Fusion Divertor Plasmas. ORNL, Oak Ridge, 8-9 September 2000.
22. COLLISIONS OF RYDBERG ATOMS WITH NEUTRAL TARGETS: PROBING LOW-ENERGY RESONANCES, BOUND AND VIRTUAL STATES. Workshop “Complex Phenomena Involving Rydberg Atoms and Molecules,” Institute for Theoretical Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, April 26-28, 2001.
23. DISSOCIATIVE ELECTRON ATTACHMENT IN GAS AND CONDENSED PHASES. International Symposium on the Dissociative Recombination of Molecules with Electrons, Chicago, IL, August 26-30, 2001.
24. THEORY OF LOW-ENERGY ELECTRON ATTACHMENT TO MOLECULES AND CLUSTERS. International Symposium on Low-Energy Electron-Molecule Interactions, Siedlce, Poland , August 29 – Sept 1, 2002.

**PUBLICATIONS****A. REFEREED JOURNALS**

1. B.P. Zapol, P. Ye, Kunin, A.V. Lyubimov, I.M. Taksar, and I.I. Fabrikant, METHOD OF EFFECTIVE POTENTIAL FOR CALCULATIONS OF ATOMIC SYSTEMS, I. CALCULATION OF WAVE FUNCTIONS AND OSCILLATOR STRENGTH FOR ALKALI ATOMS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 6, 14 (1971) (25% computation work).
2. B.P. Zapol, P. Ye, Kunin, I.M. Taksar, and I.I. Fabrikant, METHOD OF EFFECTIVE POTENTIAL FOR CALCULATIONS OF ATOMIC SYSTEMS, III. RELATIVISTIC WAVE FUNCTIONS AND EIGENVALUES, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 1, 3 (1972) (~ 30% formalism for solving of Dirac equation).
3. I.I. Fabrikant, CALCULATION OF CROSS SECTIONS FOR SCATTERING OF ELECTRONS BY ALKALI EARTH ATOMS IN BORN AND STATIC APPROXIMATIONS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 5, 3 (1973).
4. I.I. Fabrikant, INFLUENCE OF LONG-RANGE POLARIZATION ON CROSS SECTIONS FOR SCATTERING OF ELECTRONS BY ALKALI EARTH ATOMS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 5, 7 (1973).
5. I.I. Fabrikant, SCATTERING BY LONG-RANGE POTENTIALS FOR LOW ENERGIES, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 6, 11 (1973).
6. I.I. Fabrikant, LOW-ENERGY ELECTRON SCATTERING BY ATOMIC MAGNESIUM, *J. Phys. B* **7**, 91 (1974).
7. I.I. Fabrikant, THE VIOLATION OF THE WIGNER LAW IN A PROBLEM WITH DEGENERATE CHANNELS COUPLED BY LONG-RANGE POTENTIAL, *J. Phys. B* **7**, L259 (1974).
8. I.I. Fabrikant and E. Kotomin, THE THEORY OF DIFFUSION-LIMITED RECOMBINATION OF DONOR-ACCEPTOR PAIRS, *J. of Luminescence* **9**, 502 (1975) (50%, analytic solution of diffusion equation).
9. R.J. Damburg and I.I. Fabrikant, THRESHOLD LAW FOR A MODEL WITH LONG-RANGE INTERACTION, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 2, 8 (1975) (50%, analytic solution of close-coupling equations).
10. I.I. Fabrikant and E.A. Kotomin, THE THEORY OF DIFFUSION-LIMITED RECOMBINATION OF DONOR-ACCEPTOR PAIRS. I. Quasistationary Solution, *Ucheniye Zapiski Lgu* **208**, vip. 2, 78 (1974) (50%, analytic solution of diffusion equation).
11. E.A. Kotomin and I.I. Fabrikant, THE THEORY OF DIFFUSION-LIMITED RECOMBINATION OF DONOR-ACCEPTOR PAIRS. III. Inclusion of the Coulomb Interaction, *Ucheniye Zapiski Lgu*, vip. 2, 108 (1974) (50%, analytic solution of diffusion equation).

12. I.I. Fabrikant, COLLISIONS OF SLOW ELECTRONS WITH ALKALI EARTH ATOMS. In *Atomniye Protsessi*, P. 80, Riga, Zinatne, 1975.
13. I.I. Fabrikant, EFFECT OF LOW-LYING D LEVEL ON ELECTRON EXCITATION CROSS SECTIONS FOR THE Cs RESONANCE LINE, *Opt. Spectrosc* **41**, 106 (1976).
14. I.I. Fabrikant, SCATTERING OF SLOW ELECTRONS BY POLAR MOLECULES, *Sov. Phys. JETP* **44**, 77 (1976).
15. I.I. Fabrikant, ELECTRON SCATTERING BY RUBIDIUM BELOW THE EXCITATION THRESHOLD, *Phys. Lett. A* **58**, 21 (1976).
16. I. I. Fabrikant, THERMAL-ELECTRON SCATTERING BY POLAR MOLECULES, *J. Phys. B* **10**, 1761 (1977).
17. E. Kotomin, I. Fabrikant, and I. Tale, TEMPERATURE DEPENDENCE OF F-CENTRE ACCUMULATION EFFICIENCY IN DOPED ALKALI HALIDES, *J. Phys. C* **10**, 2903 (1977).
18. E. Kotomin and I. Fabrikant, THEORY OF DIFFUSION CONTROLLED TUNNELING RECOMBINATION INCORPORATING COULOMB INTERACTION AND ANNIHILATION, *J. Phys. C* **10**, 4931 (1977).
19. I.I. Fabrikant, THRESHOLD BEHAVIOR OF CROSS SECTIONS FOR ELECTRON SCATTERING BY POLAR MOLECULES, *Sov. Phys. JETP* **46**, 693 (1977).
20. I.I. Fabrikant and E.A. Kotomin, VARIATIONAL ESTIMATES OF QUASISTATIONARY RADIUS OF DIFFUSION CONTROLLED TUNNELING RECOMBINATION INCORPORATING ANNIHILATION AND COULOMB INTERACTION. In *Elektronniye ionniye processi v ionnikh kristallakh*, vip. 6, p. 39, Latv. Univ., 1977.
21. I.I. Fabrikant, THE INFLUENCE OF LONG-RANGE INTERACTION ON THE VIBRATIONAL EXCITATION OF POLAR MOLECULES BY ELECTRONS, *J. Phys. B* **11**, 3621 (1978).
22. I.I. Fabrikant, SCATTERING OF ELECTRONS BY BARIUM ATOMS ABOVE THE IONIZATION THRESHOLD, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 1, 16 (1979).
23. I.I. Fabrikant and E.A. Kotomin, EFFICIENCY OF F-CENTRE RADIATION ACCUMULATION IN IONIC CRYSTALS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 1, 53 (1979).
24. I.I. Fabrikant and E.A. Kotomin, ESTIMATE OF QUASISTATIONARY RADIUS OF DIFFUSION CONTROLLED RECOMBINATION OF DEFECTS WITH THE INCLUSION OF TUNNELING AND ELASTIC INTERACTION, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, no. 3, 76 (1979).
25. I.I. Fabrikant, THE INFLUENCE OF  $ar^{-5}$  POTENTIAL ON ELECTRON SCATTERING BY POLAR MOLECULES, *J. Phys. B* **12**, 3599 (1979).

26. I.I. Fabrikant, CALCULATION OF ELECTRON SCATTERING CROSS SECTIONS FOR MAGNESIUM AND BARIUM, *J. Phys. B* **13**, 603 (1980).
27. E. Kotomin and I. Fabrikant, INFLUENCE OF DEFECT INTERACTION UPON THEIR RECOMBINATION IN IONIC CRYSTALS. I, II., *Radiation effects* **46**, 85 (1980); **92** (1980).
28. I.I. Fabrikant, MECHANISM OF FORMATION OF SHAPE RESONANCES IN THE EXCITATION OF  $2^3s$  STATE OF HELIUM BY ELECTRONS, *Opt. Spectrosc.* **48**, 123 (1980).
29. I.I. Fabrikant, DIFFERENTIAL CROSS SECTIONS FOR ELECTRON SCATTERING BY POLAR MOLECULES. ELASTIC SCATTERING AND VIBRATIONAL EXCITATION, *Phys. Let. A* **77**, 421 (1980).
30. I.I. Fabrikant, INTERFERENCE EFFECTS IN PHOTODETACHMENT AND PHOTO-IONIZATION OF ATOMS IN HOMOGENEOUS ELECTRIC FIELD, *Sov. Phys. JETP* **52**, 1045 (1980).
31. I.I. Fabrikant, PARTIAL-WAVE ANALYSIS OF LOW-ENERGY ELECTRON SCATTERING BY QUADRUPOLE MOLECULES, *J. Phys. B* **14**, 335 (1981).
32. Yu. I. Ryabikh and I.I. Fabrikant, PARTIAL-WAVE ANALYSIS OF LOW-ENERGY ELECTRON SCATTERING BY ALUMINUM ATOMS, *J. Phys. B* **14**, 349 (1981).
33. I.I. Fabrikant, RESONANCES IN SCATTERING OF ULTRA-SLOW ELECTRONS BY ALKALI ATOMS, *Opt. Spectrosc.* **53**, 131 (1982).
34. I.I. Fabrikant, PROCESSES OF PHOTODISINTEGRATION OF ATOMIC PARTICLES IN A HOMOGENEOUS ELECTRIC FIELD, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 4, 18 (1982).
35. I.I. Fabrikant, SCATTERING OF ELECTRONS BY ATOMS AND PHOTODETACHMENT OF NEGATIVE IONS IN HOMOGENEOUS ELECTRIC FIELD, *Sov. Phys. JETP* **56**, 967 (1982).
36. I.I. Fabrikant, O.B. Shpenik, A.N. Zaviropulo, and A.V. Snegursky, SOME ASPECTS OF THE EXCITATION OF METASTABLE STATES OF THE HELIUM ATOM BY ELECTRON IMPACT, *Opt. Spectrosc.* **55**, 370 (1983).
37. I.I. Fabrikant, GENERALIZED QUANTUM DEFECT THEORY FOR ELECTRON SCATTERING BY POLAR MOLECULES, *J. Phys. B* **16**, 1253 (1983).
38. I.I. Fabrikant, FRAME-TRANSFORMATION EFFECTIVE-RANGE THEORY: APPLICATION TO INTERACTION OF POLAR MOLECULES WITH ELECTRONS, *J. Phys. B* **16**, 1269 (1983).
39. I.I. Fabrikant, O.B. Shpenik, A.N. Zaviropulo, and A.V. Snegursky, CHARACTERISTICS OF ELECTRON-IMPACT EXCITATION OF METASTABLE STATES OF INERT GAS ATOMS, *Opt. Spectrosc.* **56**, 454 (1984).

40. A.K. Kazansky, I.I. Fabrikant, SCATTERING OF SLOW ELECTRONS BY MOLECULES (review), *Sov. Phys. Usp. Fiz. Nauk* **27**, 607 (1984).
41. O.B. Shpenik, A.N. Zaviopulo, A.V. Snegursky, and I.I. Fabrikant, EXCITATION OF METASTABLE LEVELS OF NOBLE-GAS ATOMS IN CROSSED ELECTRON AND GAS DYNAMICAL ATOMIC BEAMS, *J. Phys. B* **17**, 887 (1984).
42. V.I. Lendyel, I.I. Fabrikant, and I.I. Cherlenyak, EXCITATION OF THE  $3P^{\circ}$  STATE OF THE HELIUM ATOM BY ELECTRON IMPACT, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 5, 19 (1985).
43. I.I. Fabrikant, CALCULATION OF CORRELATION PARAMETERS FOR THE EXCITATION OF THE Mg AND Ba ATOMS BY ELECTRONS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 6, 11 (1985).
44. I.I. Fabrikant, EFFECTIVE-RANGE ANALYSIS OF LOW-ENERGY ELECTRON SCATTERING BY NON-POLAR MOLECULES, *J. Phys. B* **17**, 4223 (1984).
45. I.I. Fabrikant, R-MATRIX THEORY OF VIBRATIONAL EXCITATION OF THE HCl MOLECULE BY SLOW ELECTRONS IN THE ADIABATIC APPROXIMATION, *J. Phys. B* **18**, 1873 (1985).
46. I.I. Fabrikant, INTERACTION OF RYDBERG ATOMS AND THERMAL ELECTRONS WITH K, Rb and Cs ATOMS, *J. Phys. B* **19**, 1527 (1986).
47. V.I. Lendyel, I.I. Fabrikant, and I.I. Cherlenyak, EXCITATION OF LONG-LIVED AUTOIONIZING STATES OF Li AND  $Li^{+}$ , *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, N. 2, 6 (1986).
48. I.I. Fabrikant, VIBRATIONAL EXCITATION OF HF MOLECULE BY SLOW ELECTRONS, *Izvestiya Ak. Nauk Latv. SSR, ser. fiz.*, No. 4, 3 (1985).
49. I.I. Fabrikant and I.I. Cherlenyak, SPIN-EXCHANGE PROCESSES FOR THERMAL ELECTRON SCATTERING BY HELIUM ATOMS IN THE  $2^3S$  STATE, *Sov. Phys. Technical Physics* **32**, 1009 (1987).

**REFEREED JOURNALS (continued)**

50. I.I. Fabrikant, R-MATRIX THEORY OF INELASTIC PROCESSES IN LOW-ENERGY ELECTRON COLLISIONS WITH HCl MOLECULES, *Z. Physik D* **3**, 401 (1986).
51. I.I. Fabrikant, O.B. Shpenik, A.N. Zaviopulo and A.V. Snegurskii, EFFECT OF COLLISION PARAMETERS ON OBSERVED CROSS SECTIONS FOR ELECTRON EXCITATION OF METASTABLE HELIUM ATOMS, *Opt. Spectrosc.* **61**, 848 (1986).
52. I.I. Fabrikant, O.B. Shpenik, A.V. Snegursky and A.A. Zaviopulo, ELECTRON IMPACT FORMATION OF METASTABLE ATOMS, *Phys. Rep.* **159**, 1 (1988).

53. I.I. Fabrikant, RESCATTERING OF PHOTODETACHED ELECTRONS IN A STARK FIELD, *Phys. Rev A* **40**, 2373 (1989).
54. I.I. Fabrikant, ELECTRON DRIFT IN CAESIUM VAPORS, *Teplofizika Visokikh Temperatur (High Temperature Thermal Physics)* **27**, 240 (1989). [*High Temp. (USA)* **27**,183 (1989).]
55. I.I. Fabrikant, RESONANCE PROCESSES IN  $e\text{-HC}l$  COLLISIONS; COMPARISON OF THE R-MATRIX AND THE NONLOCAL-COMPLEX POTENTIAL METHODS, *Comments on Atomic and Molecular Physics* **24**, 37 (1990).
56. I.I. Fabrikant, SPATIAL DISTRIBUTION OF ELECTRONS PHOTODETACHED IN AN ELECTRIC FIELD, *J. Phys. B* **23**, 1139 (1990).
57. I.I. Fabrikant, NEAR-THRESHOLD PHOTODETACHMENT OF  $\text{H}^-$  IN PARALLEL AND CROSSED ELECTRIC AND MAGNETIC FIELDS, *Phys. Rev.* **43**, 258 (1991).
58. I.I. Fabrikant, QUASICLASSICAL R-MATRIX THEORY OF INELASTIC PROCESSES IN COLLISIONS OF ELECTRONS WITH  $\text{HC}l$  MOLECULES, *Phys. Rev. A* **43**, 3478 (1991).
59. I.I. Fabrikant, A MODEL DESCRIBING INELASTIC PROCESSES IN LOW-ENERGY ELECTRON COLLISIONS WITH METHYL CHLORIDE, *J. Phys. B* **24**, 2213 (1991).
60. I.I. Fabrikant, S.A. Kalin, and A.K. Kazansky, INELASTIC PROCESSES IN  $e\text{-HC}l$  COLLISIONS IN THE ENERGY RANGE INCLUDING THE DISSOCIATION THRESHOLD, *J. Chem. Phys.* **95**, 4966 (1991).
61. V.M. Borodin, I.I. Fabrikant, and A.K. Kazansky, COLLISIONAL BROADENING OF RYDBERG STATES BY ALKALI PERTURBERS, *Phys. Rev. A* **44**, 5725 (1991).
62. I.I. Fabrikant, S.A. Kalin, and A.K. Kazansky, RESONANT R-MATRIX THEORY OF INELASTIC PROCESSES IN COLLISIONS OF ELECTRONS WITH  $\text{HF}$  MOLECULES, *J. Phys. B* **25**, 2885 (1992).
63. I.I. Fabrikant, IMPULSE-APPROXIMATION ANALYSIS OF COLLISIONS BETWEEN RYDBERG AND GROUND-STATE RUBIDIUM ATOMS AT THERMAL ENERGIES, *Phys. Rev. A* **45**, 6404 (1992).
64. I.I. Fabrikant, ELECTRON DRIFT IN ALKALI-METAL VAPOURS, *J. Phys. B* **25**, 4865 (1992).
65. V.M. Borodin, I.I. Fabrikant, and A.K. Kazansky, COLLISIONAL BROADENING OF RYDBERG ATOMS PERTURBED BY GROUND-STATE SODIUM ATOMS, *Z. Physik D* **27**, 45 (1993).
66. V.M. Borodin, A.K. Kazansky, D.B. Khrebtukov, and I.I. Fabrikant, ADIABATIC COMPLEX-PLANE CALCULATIONS OF RYDBERG STATES BROADENING BY  $\text{Rb}$  AND  $\text{K}$  PERTURBERS, *Phys. Rev. A* **48**, 479 (1993).

67. I.I. Fabrikant, THEORY OF A NEGATIVE ION DECAY IN AN EXTERNAL ELECTRIC FIELD, *J. Phys. B* **26**, 2533 (1993).
68. N.-Y. Du, I.I. Fabrikant, and A.F. Starace, ELECTRIC-FIELD EFFECTS IN  $H^-$  PHOTO-DETACHMENT WITH EXCITATION OF  $H$  ( $n=2$ ), *Phys. Rev. A* **48**, 2968 (1993).
69. I.I. Fabrikant, ELECTRON TRANSFER IN  $Ca^*(4snl)-Ca(4s^2)$  COLLISIONS, *Phys. Rev. A* **48**, R3411 (1993).
70. I.I. Fabrikant, SEMIEMPIRICAL CALCULATIONS OF INELASTIC ELECTRON-METHYLCHLORIDE SCATTERING, *J. Phys. B* **27**, 4325 (1994).
71. M.T. Frey, S.B. Hill, X. Ling, K.A. Smith, F.B. Dunning, and I.I. Fabrikant, INELASTIC ELECTRON-DIPOLE-MOLECULE SCATTERING AT SUB-MILLIELECTRONVOLT ENERGIES: ROLE OF DIPOLE-SUPPORTED STATES, *Phys. Rev. A* **50**, 3124 (1994).
72. I.I. Fabrikant, PHOTODETACHMENT FROM THE  $S^-$  AND  $Cl^-$  IONS IN A STATIC ELECTRIC FIELD AND LOW-ENERGY ELECTRON SCATTERING BY THE  $S$  AND  $Cl$  ATOMS, *J. Phys. B* **27**, 4545 (1994).
73. D.M. Pearl, P.D. Burrow, I.I. Fabrikant, and G.A. Gallup, DISSOCIATIVE ATTACHMENT IN HOT  $CH_3Cl$ : EXPERIMENT AND THEORY, *J. Chem. Phys.* **102**, 2737 (1995).
74. D.B. Khrebtukov and I.I. Fabrikant, OFF-SHELL EFFECT IN RYDBERG-ATOM-ALKALI-METAL-ATOM SCATTERING, *Phys. Rev. A* **51**, 4675 (1995).
75. M.T. Frey, S.B. Hill, K.A. Smith, F.B. Dunning, and I.I. Fabrikant, STUDIES OF ELECTRON-MOLECULE SCATTERING AT MICROELECTRONVOLT ENERGIES USING VERY-HIGH  $n$  RYDBERG ATOMS, *Phys. Rev. Lett.* **75**, 810 (1995).
76. L. Sanche, A.D. Bass, P. Ayotte, and I.I. Fabrikant, THE EFFECT OF THE CONDENSED PHASE ON DISSOCIATIVE ELECTRON ATTACHMENT:  $CH_3Cl$  CONDENSED ON A  $Kr$  SURFACE, *Phys. Rev. Lett.* **75**, 3568 (1995).
77. P.D. Burrow, G.A. Gallup, I.I. Fabrikant and K.D. Jordan, DISSOCIATIVE ATTACHMENT STUDIES OF HALOGEN-CONTAINING MOLECULES: PROBLEMS, APPLICATIONS AND CHALLENGES, *Aust. J. Phys.* **49**, 403 (1996).
78. I.I. Fabrikant, ELECTRON SCATTERING BY NEUTRAL TARGETS AT MILLI- AND SUBMILLI-ELECTRON-VOLT ENERGIES, *Comments on At. Mol. Phys.* **32**, 267 (1996).
79. S.B. Hill, M.T. Frey, F.B. Dunning, and I.I. Fabrikant, ELECTRON-HF SCATTERING AT ULTRA-LOW ELECTRON ENERGIES, *Phys. Rev. A.* **53**, 3348 (1996).
80. V.S. Lebedev and I.I. Fabrikant, INELASTIC AND QUASIELASTIC COLLISIONS OF RYDBERG ATOMS WITH THE HEAVY RARE-GAS ATOMS, *Phys. Rev. A* **54**, 2888 (1996).

81. D.B. Khrebtukov and I.I. Fabrikant, THEORY OF ION-PAIR FORMATION IN RYDBERG-ATOM-GROUNDSTATE-ATOM COLLISIONS, *Phys. Rev. A* **54**, 2906 (1996).
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