

## TITLES OF PAPERS BY MIHAI GAVRILĂ

### **List I: Publications on Atomic Inner-Shell Radiative Transitions and Related (1953–2003)**

#### **A. Articles in Journals**

1. M. Gavrila,  
*A Derivation of the Liénard-Wiechert Formulas*, Revista Universității "C. I. Parhon" și a Politehnicii București, Seria Științelor Naturii **I** (2), 57–61 (1953), (in Romanian).
2. M. Gavrila,  
*Derivation of Sauter's formula for the photoelectric effect by means of Born's approximation method*, Studii și Cercetări de Fizică **8** (4), 421–432 (1957), (in Romanian).
3. M. Gavrila,  
*On Hall's formula for the relativistic photoeffect*, Studii și Cercetări de Fizică **9** (3), 317–322 (1958), (in Romanian).
4. M. Gavrila,  
*On Hall's Formula for the Relativistic Photoeffect*, Nuovo Cimento **9** (2), 327–330 (1958).
5. Mihai Gavrila,  
*Relativistic K-Shell Photoeffect*, Physical Review **113** (2), 514–526 (1959).
6. M. Gavrila,  
*On the relativistic K-shell photoelectric effect*, Studii și Cercetări de Fizică **11** (1), 49–54 (1960), (in Romanian).
7. M. Gavrila,  
*On the Relativistic K-Shell Photoeffect*, Nuovo Cimento **15** (4), 691–694 (1960).
8. M. Gavrila,  
*The Relativistic Photoeffect in the L-Shell*, Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki (JETP) **38** (1), 309–311 (1960): Letter (in Russian);  
*The Relativistic Photoeffect in the L-Shell*, Soviet Physics JETP **11** (1), 224–226 (1960): Letter.

9. M. Gavrila,  
*On the theory of the atomic photoelectric effect*, Revista Învățămîntului Superior **3** (1), 45–49 (1961), (in Romanian).
10. Mihai Gavrila,  
*Relativistic L-Shell Photoeffect*, Physical Review **124** (4), 1132–1141 (1961).
11. D. H. Constantinescu and M. Gavrila,  
*Coherent scattering of light by atomic hydrogen*, Revue Roumaine de Physique **12** (2), 121–137 (1967).
12. Mihai Gavrila,  
*Analytic evaluation of the Kramers-Heisenberg matrix element for coherent scattering of photons by atomic hydrogen*, Revue Roumaine de Physique **12** (8), 745–759 (1967).
13. Mihai Gavrila,  
*Elastic Scattering of Photons by a Hydrogen Atom*, Physical Review **163** (1), 147–155 (1967).
14. M. Gavrila and A. Costescu,  
*Retardation in the Elastic Scattering of Photons by Atomic Hydrogen*, Physics Letters **28 A** (9), 614–615 (1969).
15. M. Gavrila,  
*Compton Scattering of Photons by Bound K-Shell Electrons*, Lettere al Nuovo Cimento Serie I, **2**, 180–184 (1969).
16. M. Gavrila and A. Costescu,  
*Retardation in the Elastic Scattering of Photons by Atomic Hydrogen*, Physical Review **A 2** (5), 1752–1758 (1970).  
Erratum: Physical Review **A 4** (4), 1688–1688 (1971).
17. Mihai Gavrila,  
*Compton Scattering by K-Shell Electrons. I. Nonrelativistic Theory with Retardation*, Physical Review **A 6** (4), 1348–1359 (1972).
18. Mihai Gavrila,  
*Compton Scattering by K-Shell Electrons. II. Nonrelativistic Dipole Approximation*, Physical Review **A 6** (4), 1360–1367 (1972).
19. A. Costescu and M. Gavrila,  
*Compton scattering by L-shell electrons*, Revue Roumaine de Physique **18** (4), 493–521 (1973).
20. M. Gavrila,  
*Numerical results for nonrelativistic Compton scattering of photons by K-shell electrons in the dipole approximation*, Revue Roumaine de Physique **19** (5), 473–487 (1974).  
Erratum: Revue Roumaine de Physique, **19** (7), 776–776 (1974).

21. M. Gavrila and M. N. Țugulea,  
*Compton scattering by L-shell electrons. II*, Revue Roumaine de Physique **20** (3), 209–230 (1975).
22. V. Florescu and M. Gavrila,  
*Elastic scattering of photons by K-shell electrons at high energies*, Physical Review A **14** (1), 211–235 (1976).
23. M. Gavrila and J. E. Hansen,  
*Calculation of  $K_{\alpha\alpha}$  and  $K_{\alpha h}$  transition rates*, Physics Letters **58 A** (3), 158–160 (1976).
24. T. P. Hoogkamer, P. H. Woerlee, F. W. Saris, and M. Gavrila,  
*Two-electron, one-photon transitions following double K-shell ionization in symmetric collisions of N, O and Ne*, Journal of Physics B: Atomic, Molecular and Optical Physics **9** (6), L145–L147 (1976).
25. M. Gavrila and James McEnnan,  
*Radiative corrections to photoeffect and the high-frequency end of the bremsstrahlung spectrum*, Physics Letters **59 A** (6), 441–444 (1977).
26. James McEnnan and M. Gavrila,  
*Radiative corrections to the atomic photoeffect*, Physical Review A **15** (4), 1537–1556 (1977).
27. James McEnnan and M. Gavrila,  
*Radiative corrections to the high-frequency end of the bremsstrahlung spectrum*, Physical Review A **15** (4), 1557–1562 (1977).
28. M. Gavrila and J. E. Hansen,  
*Calculation of transition probabilities for two-electron, one-photon and hypersatellite transitions for ions with two vacancies in the K shell*, Journal of Physics B: Atomic, Molecular and Optical Physics **11** (8), 1353–1381 (1978).
29. Mihai Gavrila,  
*Rayleigh Scattering from  $n=2$  States of Atomic Hydrogen*, Zeitschrift für Physik A: Hadrons and Nuclei **293** (3), 269–279 (1979).
30. M. Gavrila and P. Mandal,  
*High-energy form of second Born exchange amplitudes for electron-hydrogen scattering*, Physics Letters **84 A** (8), 417–420 (1981).
31. David J. Botto and M. Gavrila,  
*Radiative corrections to atomic photoeffect and tip-bremsstrahlung. III*, Physical Review A **26** (1), 237–249 (1982).

32. V. Véniard, M. Gavrila, and A. Maquet,  
*Two-photon bremsstrahlung*, Physical Review A **35** (1), 448–451 (1987):  
Rapid Communication.
33. V. Florescu and M. Gavrila,  
*Soft-photon emission in extreme-relativistic Compton scattering by K-shell electrons, and connection to photoeffect*, Radiation Physics and Chemistry **59** (2), 127–136 (2000).
34. V. Florescu and M. Gavrila,  
*Extreme-relativistic cross sections for Compton scattering by K-shell electrons*, Romanian Journal of Physics **48** (5–6), 639–648 (2003).
35. Viorica Florescu and Mihai Gavrila,  
*Extreme-relativistic Compton scattering by K-shell electrons*, Physical Review A **68** (5), 052709: 1–17 (2003).

**B. Reports, Contributions to Edited Volumes,  
Articles in the Bulletin of the American Physical Society, & Varia**

36. M. Gavrila,  
*Coherent scattering of light by atomic hydrogen. II.*, Joint Institute for Laboratory Astrophysics (JILA) Report **86**, 25 pages, Boulder, Colorado, September 1966.
37. Mihai Gavrila,  
*Education in physics at US universities*, FORUM – Revista Învățămîntului Superior **13** (4), 52–59 (1971), (in Romanian).
38. M. Gavrila, H. K. Tseng, and R. H. Pratt,  
*Coherent and incoherent scattering of photons by bound electrons. Limitations of present theoretical evaluations of the cross sections*, University of Pittsburgh PITT-Report **2**, 44 pages, prepared for the National Bureau of Standards, Washington, D. C., May 1973.
39. M. Gavrila,  
*Photoionization*, in the volume *Atoms, Molecules, and Lasers*, (Lectures presented at the International Winter College, Trieste, 1973), (International Atomic Energy Agency, Vienna, 1974), pp. 679–701.
40. M. Gavrila and V. Florescu,  
*Elastic Scattering of Photons by K-shell Electrons at Very High Energy*, Bulletin of the American Physical Society **19** (4), 469–469 (1974).
41. V. Florescu and M. Gavrila,  
*Radiationless Annihilation of Positrons*, Bulletin of the American Physical Society **19** (4), 593–593 (1974).

42. V. Florescu and M. Gavrilă,  
*Rayleigh scattering by K-shell electrons of light elements. Numerical results*, University of Pittsburgh PITT-Report, 53 pages, prepared for the Lawrence Livermore National Laboratory, Livermore, California, June 1975.
43. James McEnnan and M. Gavrilă,  
*Radiative Corrections to Atomic Photoeffect*, Bulletin of the American Physical Society **20** (1), 91–91 (1975).
44. James McEnnan and M. Gavrilă,  
*Radiative Corrections to Bremsstrahlung in the High-Frequency Limit*, Bulletin of the American Physical Society **21** (1), 50–50 (1976).
45. David J. Botto, R. H. Pratt, and M. Gavrilă,  
*Radiative Corrections to the Atomic Photoeffect*, Bulletin of the American Physical Society **24** (1), 16–16 (1979).
46. M. Gavrilă,  
*Photon-atom elastic scattering in the volume X-ray and Atomic Inner-Shell Physics*, (Proceedings of X 82), Editor: Bernd Crasemann, AIP Conference Proceedings **94**, (1982), pp. 357–388.
47. M. Gavrilă,  
*Rayleigh scattering S-matrix calculations: How accurate is the atomic description?*, University of Pittsburgh PITT-Report **314**, 69 pages, prepared for the Lawrence Livermore National Laboratory, Livermore, California, February 1984.
48. M. Gavrilă,  
*Corrections to S-matrix results for anomalous scattering*, University of Pittsburgh PITT-Report **340**, 25 pages, prepared for the Lawrence Livermore National Laboratory, Livermore, California, 1986.

## **List II:**

### **Publications on Laser-Atom Interactions (1976 -2008)**

#### **A. Articles in Journals**

49. P. J. K. Langendam, M. Gavrilă, J. P. J. Kaandorp, and M. J. van der Wiel,  
*Resonant free-free absorption by electrons in the field of a neon atom*, Journal of Physics B: Atomic, Molecular and Optical Physics **9** (15), L453-L457 (1976).
50. M. Gavrilă and M. J. van der Wiel,  
*Free-free radiative transitions of electron-atom systems*, Comments on Atomic and Molecular Physics **8** (1-2), 1–20 (1978).

51. M. Gavrilă and J. Z. Kamiński,  
*Free-Free Transitions in Intense, High-Frequency Laser Fields*, Physical Review Letters **52** (8), 613–616 (1984).
52. M. J. Offerhaus, J. Z. Kamiński, and M. Gavrilă,  
*Coulomb scattering in intense, high-frequency laser fields*, Physics Letters **112 A** (3,4), 151–155 (1985).
53. M. Gavrilă, A. Maquet, and V. Véliard,  
*Two-photon free-free transitions in a Coulomb potential*, Physical Review A **32** (4), 2537–2540 (1985): Rapid Communication.  
Erratum: Physical Review A **33** (4), 2826–2826 (1986).
54. M. Gavrilă, M. J. Offerhaus, and J. Z. Kamiński,  
*Elastic scattering from a Yukawa potential in intense, high-frequency radiation fields*, Physics Letters **118 A** (7), 331–335 (1986).
55. M. Pont and M. Gavrilă,  
*The levels of atomic hydrogen in intense, high-frequency laser fields*, Physics Letters **123 A** (9), 469–474 (1987).
56. M. Pont, N. R. Walet, M. Gavrilă, and C. W. McCurdy,  
*Dichotomy of the Hydrogen Atom in Superintense, High-Frequency Laser Fields*, Physical Review Letters **61** (8), 939–942 (1988).
57. M. Pont, M. J. Offerhaus, and M. Gavrilă,  
*Atomic hydrogen in circularly polarized, high-intensity and high-frequency laser fields*, Zeitschrift für Physik D – Atoms, Molecules and Clusters **9** (4), 297–306 (1988).
58. J. van de Ree, J. Z. Kamiński, and M. Gavrilă,  
*Modified Coulomb scattering in intense, high-frequency laser fields*, Physical Review A **37** (11), 4536–4539 (1988): Rapid Communication.
59. M. Pont, N. R. Walet, and M. Gavrilă,  
*Radiative distortion of the hydrogen atom in superintense, high-frequency fields of linear polarization*, Physical Review A **41** (1), 477–494 (1990).
60. M. Pont and M. Gavrilă,  
*Stabilization of Atomic Hydrogen in Superintense, High-Frequency Laser Fields of Circular Polarization*, Physical Review Letters **65** (19), 2362–2365 (1990).
61. M. Gavrilă, A. Maquet, and V. Véliard,  
*Stimulated two-photon free-free transitions in a Coulomb potential: Formalism*, Physical Review A **42** (1), 236–247 (1990).

62. R. J. Vos and M. Gavrilă,  
*Effective Stabilization of Rydberg States at Current Laser Performances*,  
Physical Review Letters **68** (2), 170–173 (1992).
63. H. G. Müller and M. Gavrilă,  
*Light-Induced Excited States in  $H^-$* , Physical Review Letters **71** (11), 1693–1696  
(1993).
64. J. Shertzer, A. Chandler, and M. Gavrilă,  
 *$H_2^+$  in Superintense Laser Fields: Alignment and Spectral Restructuring*,  
Physical Review Letters **73** (15), 2039–2042 (1994).
65. M. Marinescu and M. Gavrilă,  
*First iteration within the high-frequency Floquet theory of laser-atom  
interactions*, Physical Review A **53** (4), 2513–2521 (1996).
66. M. Gavrilă and J. Shertzer,  
*Two-electron atoms in superintense radiation fields: Dichotomy and stabilization*,  
Physical Review A **53** (5), 3431–3443 (1996).
67. Ernst van Duijn, M. Gavrilă, and H. G. Müller,  
*Multiply Charged Negative Ions of Hydrogen Induced by Superintense Laser  
Fields*, Physical Review Letters **77** (18), 3759–3762 (1996).
68. J. C. Wells, I. Simbotin, and M. Gavrilă,  
*Multistate High-Frequency Floquet Theory*, Laser Physics **7** (3), 525–536 (1997).
69. J. C. Wells, I. Simbotin, and M. Gavrilă,  
*High-frequency Floquet-theory content of wave-packet dynamics*, Physical  
Review A **56** (5), 3961–3973 (1997).
70. J. C. Wells, I. Simbotin, and M. Gavrilă,  
*Physical Reality of Light-Induced Atomic States*, Physical Review Letters **80**  
(16), 3479–3482 (1998).
71. J. C. Wells, I. Simbotin, and M. Gavrilă,  
*Comment on "Physical Reality of Light-Induced Atomic States" Reply*, Physical  
Review Letters **82** (3), 665–665 (1999).
72. M. Dondera, H. G. Müller, and M. Gavrilă,  
*Observability of the dynamic stabilization of ground-state hydrogen with  
superintense femtosecond laser pulses*, Physical Review A **65** (3), 031405(R):  
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73. M. Dondera, H. G. Müller, and M. Gavrilă,  
*Dynamic Stabilization of Ground-State Hydrogen in Superintense Laser Pulses  
of Finite Duration*, Laser Physics **12** (2), 415–423 (2002).

74. Mihai Gavrilă,  
*Atomic stabilization in superintense laser fields*, Journal of Physics B: Atomic, Molecular and Optical Physics **35** (18), R147 – R193 (2002): Topical Review.
75. M. Boca, H. G. Muller, and M. Gavrilă,  
*Dynamic stabilization of ground-state hydrogen in superintense circularly polarized laser pulses*, Journal of Physics B: Atomic, Molecular and Optical Physics **37** (1), 147–163 (2004).
76. I. Simbotin, M. Stroe, and M. Gavrilă,  
*Quasistationary Stabilization and Atomic Dichotomy in Superintense Low-Frequency Fields*, Laser Physics **14** (4), 482–491 (2004).
77. M. Gavrilă, I. Simbotin, and M. Stroe,  
*Low-frequency atomic stabilization and dichotomy in superintense laser fields from the high-intensity, high-frequency Floquet theory*, Physical Review A **78** (3), 033404: 1–12 (2008).
78. M. Stroe, I. Simbotin, and M. Gavrilă,  
*Low-frequency atomic stabilization and dichotomy in superintense laser fields: Full Floquet results*, Physical Review A **78** (3), 033405: 1–11 (2008).

#### B. Contributions to Edited Volumes and Books

79. M. Gavrilă,  
*Free-free photoabsorption of electron-atom systems*, in the volume *Electronic and Atomic Collisions* (Proceedings of the X ICPEAC, 1977), Editor: G. Watel, (North-Holland, Amsterdam, 1978), pp. 165–184.
80. M. Gavrilă,  
*Multiphoton processes at high laser intensities*, in the volume *Atomic Physics 9*, (Proceedings of ICAP 9, Seattle, Washington, 1984), Editors: Robert S. Van Dyck, Jr. and E. Norval Fortson, (World Scientific, Singapore, 1985), pp. 523–554.
81. M. Gavrilă,  
*Electron-atom interactions in intense, high-frequency laser fields*, in the volume *Fundamentals of Laser Interactions I*, Editor: Fritz Ehlotzky, Lecture Notes in Physics **229**, (Springer, Berlin, 1985), pp. 3–15.
82. M. Gavrilă,  
*Atomic processes in high-intensity laser fields*, in the volume *Atoms in Unusual Situations*, Editor: Jean Pierre Briand, NATO Advanced Study Institute Series B, Physics **143**, (Plenum Press, New York, 1986), pp. 225–239.
83. M. Gavrilă, J. Z. Kamiński, and M. J. Offerhaus,  
*Electron scattering in intense, high-frequency laser fields*, in the volume *Photons and Continuum States of Atoms and Molecules*, Editors: Naseem K.



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84. M. Gavrila and M. Pont,  
*Atomic hydrogen in intense, high-frequency laser fields*, in the volume *Atomic and Molecular Processes with Short Intense Laser Pulses*, Editor: André D. Bandrauk, NATO Advanced Study Institute Series B, Physics **171**, (Plenum Press, New York, 1988), pp. 285–295.
85. M. Gavrila,  
*Free-free transitions of electron-atom systems in intense radiation fields*, in the volume *Collision Theory for Atoms and Molecules*, Editor: Francesco A. Gianturco, NATO Advanced Study Institute Series B, Physics **196**, (Plenum Press, New York, 1989), pp. 139–189.
86. M. Gavrila, M. Pont, and J. van de Ree,  
*Atomic interactions in superintense, high-frequency laser fields*, in the volume *Fundamentals of Laser Interactions II*, Editor: Fritz Ehlotzky, Lecture Notes in Physics **339**, (Springer, Berlin, 1989), pp. 245–263.
87. Mihai Gavrila,  
*Atomic Structure and Decay in High-Frequency Fields*, in the volume *Atoms in Intense Laser Fields*, Editor: Mihai Gavrila, Advances in Atomic, Molecular, and Optical Physics, Supplement **1** (Academic Press, New York, 1992), pp. 435–510.
88. M. Gavrila,  
 *$H^-$  in intense laser fields. Laser-induced excited states and dichotomy*, in the volume *Super-Intense Laser-Atom Physics*, Editors: Bernard Piraux, Anne L’Huillier, and Kazimierz Rzażewski, NATO Advanced Study Institute Series B, Physics **316**, (Plenum Press, New York, 1993), pp. 461–481.
89. H. G. Muller and M. Gavrila,  
*Light-induced singly and doubly excited states of the negative hydrogen ion*, in the volume *The Physics of Electronic and Atomic Collisions: XVIII ICPEAC*, Editors: Torkild Andersen, Bent Fastrup, Finn Folkmann, Helge Knudsen, and N. Andersen, AIP Conference Proceedings **295**, (1993), pp. 115–124.
90. M. Gavrila,  
*Adiabatic stabilization*, in the volume *Multiphoton Processes VI*, Editors: D. Keith Evans and S. L. Chin, (World Scientific, Singapore, 1994), pp. 183–190.
91. E. van Duijn, M. Gavrila, and H. G. Muller,  
*Multiply charged negative ions of hydrogen, induced by a superintense high-frequency laser field*, in the volume *Superintense Laser-Atom Physics IV*, Editors: H.G.Muller and M. V. Fedorov, (Kluwer, Dordrecht, 1996), pp. 233–244.

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92. M. Gavrilă,  
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93. J. C. Wells, I. Simbotin, and M. Gavrilă,  
*Excess-photon ionization spectra and atomic structure in intense laser fields*, in the volume *Multiphoton Processes: ICOMP VIII*, Editors: Louis F. DiMauro, Richard R. Freeman, and Kenneth C. Kulander, AIP Conference Proceedings **525**, (2000), pp. 89–100.
94. M. Gavrilă,  
*Stabilization of atoms in ultra-strong laser fields, a decade later*, in the volume *Multiphoton Processes: ICOMP VIII*, Editors: Louis F. DiMauro, Richard R. Freeman, and Kenneth C. Kulander, AIP Conference Proceedings **525**, (2000), pp. 103–128.

@inproceedings{Golovizin2019InnershellICT, title={Inner-shell clock transition in atomic thulium with a small blackbody radiation shift}, author={Alexey Golovizin and E. Fedorova and D. Tregubov and D. Sukachev and K. Khabarova and Vladimir M. Sorokin and Nikolai N. Kolachevsky}, booktitle={Nature Communications}, year={2019} }. Alexey Golovizin, E. Fedorova, +4 authors Nikolai N. Kolachevsky. Here, we demonstrate unusually low sensitivity of a  $1.14 \mu\text{m}$  inner-shell clock transition in neutral Tm atoms to BBR. By direct polarizability measurements, we infer a differential polarizability of the clock levels of  $0.063(30)$  atomic units corresponding to a fractional frequency BBR shift of only  $2.3(1.1) \times 10^{-18}$  at room temperature. Publications referenced by this paper. Nuclear transitions are between energy levels in the nucleus. Types of nuclear transitions lead to the emission of alpha, beta, or gamma radiation. Atomic transitions involve changes in the electron orbitals. These changes can be the emission of X-rays. These changes can be the emission of X-rays from changes involving the innermost electron shells of the atom. Changes in outer electron shells can be in the visible light region of the spectrum. Molecular transitions are in the infrared or microwave region. These are rotational and vibrational states of molecules. 2.9k views · View 11 Upvoters. View more. Related Questions. ATOM-MOLECULE COLLISION THEORY: A Guide for the Experimentalist Edited by Richard B. Bernstein ATOMIC INNER-SHELL PHYSICS Edited by Bernd Crasemann ATOMS IN ASTROPHYSICS Edited by P. G. Burke, W. B. Eissner, D. G. Hummer, and I. C. Percival AUTOIONIZATION: Recent Developments and Applications Edited by Aaron Temkin COHERENCE AND CORRELATION IN ATOMIC COLLISIONS Edited by H. Kleinpoppen and]. A continuation order will bring delivery of each new volume immediately upon publication. Volumes are billed only upon actual shipment. For further information please contact the publisher. Atomic inner-shell physics. Edited. By.