

Contents

Abstract	3
Preamble and Summary	5

I Double K-shell photoionization and radiative decay of K-shell hollow atoms	15
-------------------------------------------------------------------------------------------	----

Physical mechanisms and scaling laws of K-shell double photoionization

J. Hoszowska, A.S. Kheifets, J.-Cl. Dousse, M. Berset, I. Bray, W. Cao, K. Fennane, Y. Kayser, M. Kavcic, J. Szlachetko, and M. Szlachetko;
Phys. Rev. Lett. **102**, 073006 (2009).

Double K-shell photoionization of low-Z atoms and He-like ions

J. Hoszowska, A. S. Kheifets, M. Berset, I. Bray, W. Cao, J.-Cl. Dousse, K. Fennane, M. Kavcic, Y. Kayser, J. Szlachetko and M. Szlachetko;
Eur. J. Phys. Special Topics **169**, 23 (2009).

K-shell double photoionization of Be, Mg and Ca

A. S. Kheifets, Igor Bray, J. Hoszowska; *Phys. Rev. A* **79**, 042504 (2009).

Single-photon double K-shell ionization of low-Z atoms

J. Hoszowska, A. S. Kheifets, J.-Cl. Dousse, I. Bray, W. Cao, K. Fennane, Y. Kayser, M. Kavcic, J. Szlachetko and M. Szlachetko; *J. Phys.: Conf. Series* **212**, 01206 (2010).

Double K-shell photoionization and hypersatellite x-ray transition of $12 \leq Z \leq 23$ atoms

J. Hoszowska, J.-Cl. Dousse, W. Cao, K. Fennane, Y. Kayser, M. Szlachetko J. Szlachetko, M. Kavcic; *Phys. Rev. A* **82**, 063408 (2010).

First observation of two-electron one-photon transitions in single-photon K-shell double ionization

J. Hoszowska, J.-Cl. Dousse, J. Szlachetko, Y. Kayser, W. Cao, P. Jagodzinski, M. Kavcic, and S. H. Nowak; *submitted to Phys. Rev. Lett.*

$K^h \alpha_{1,2}$ x-ray hypersatellite line broadening as a signature of K-shell double photoionization followed by outer-shell ionization and excitation

M. Polasik, K. Slabkowska, J. Rzakiewicz, K. Koziol, J. Starosta, E. Wiatrowska-Koziol, J.-Cl. Dousse, and J. Hoszowska; *submitted to Phys. Rev. Lett.*

Double K-shell ionization of Al induced by photon and electron impact

K. Fennane, J.-Cl. Dousse, J. Hoszowska, M. Berset, W. Cao, Y.-P. Maillard, J. Szlachetko, M. Szlachetko, M. Kavcic; *Phys. Rev. A* **79**, 032708 (2009).

II Hypersatellites induced in ion-atom collisions..... 81

K α hypersatellites lines of medium-mass atoms induced by 100-MeV $^4\text{He}^{2+}$ ions

B. Boschung, J.-Cl. Dousse, B. Galley, Ch. Herren, J. Hoszowska, J. Kern, Ch. Rhême, Z. Halabuka, M. Polasik; *Phys. Rev. A* **51**, 3650 (1995).

He-like hole states in mid-Z atoms studied by high-resolution K x-ray spectroscopy

J. Rzakiewicz, D. Chmielewska, T. Ludziejewski, P. Rymuza, Z. Sujkowski, D. Castella, D. Corminboeuf, J.-Cl. Dousse, B. Galley, Ch. Herren, J. Hoszowska, J. Kern, M. Polasik, M. Pajek; *Phys. Lett. A* **264**, 186 (1999).

Observation of internal structure of the L-shell x-ray hypersatellites for palladium atoms multiply ionized by fast oxygen ions

M. Czarnota, D. Banas, M. Berset, D. Chmielewska, J.-Cl. Dousse, J. Hoszowska, Y.-P. Maillard, O. Mauron, M. Pajek, M. Polasik, P. A. Raboud, J. Rzakiewicz, K. Słabkowska, and Z. Sujkowski; *Phys. Rev. A* **81**, 064702 (2010).

High-resolution X-ray study of the multiple ionization of Pd atoms by fast oxygen ions

M. Czarnota, D. Banas, M. Berset, D. Chmielewska, J.-Cl. Dousse, J. Hoszowska, Y.-P. Maillard, O. Mauron, M. Pajek, M. Polasik, P. A. Raboud, J. Rzakiewicz, K. Słabkowska, and Z. Sujkowski; *Eur. Phys. J. D.* **57**, 321 (2010).

The study of Th M-x-ray satellites and hypersatellites induced by energetic O and Ne ions

M. Czarnota, M. Pajek, D. Banas, J.-Cl. Dousse, M. Berset, O. Mauron, Y.-P. Maillard, P. A. Raboud, D. Chmielewska, J. Rzakiewicz, Z. Sujkowski, J. Hoszowska, M. Polasik, K. Słabkowska; *Rad. Physics and Chemistry* **68**, 121 (2003).

Acknowledgments..... 113