

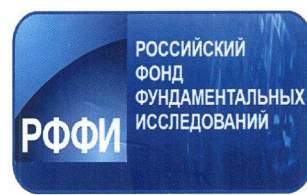
MOSCOW, RUSSIA 23-26 August, 2016



**International Conference
on Many Particle Spectroscopy
of Atoms, Molecules,
Clusters and Surfaces**

MPS 2016

Book of Abstracts



International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces

M.V. Lomonosov Moscow State University
Moscow, Russian Federation
August 23rd-26th, 2016



Book of Abstracts

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Я 34

**International Conference on Many Particle Spectroscopy
of Atoms, Molecules, Clusters and Surfaces (MPS-2016)
M.V. Lomonosov Moscow State University
Moscow, Russian Federation, 23-26 August, 2016
Book of Abstracts**

Я 34 The biennial conference concentrates on hot topics in the field of interaction of various projectiles (electrons, photons, heavy particles) with matter and includes Invited Talks and Poster Sessions.

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Preface

The biennial International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters, and Surfaces (MPS - 2016) takes place in Moscow, Russia, from 23-26 August, 2016, at the M. V. Lomonosov Moscow State University. Recent MPS conferences were held in Metz (France, 2014), Berlin (Germany, 2012), Sendai (Japan, 2010), Paris (France, 2008), and Rome (Italy, 2006). The scientific program of this international conference is focused on current studies regarding the interaction of various projectiles (photons, charged and neutral, light and heavy particles) with atoms, molecules, clusters, and surfaces. Contributions to MPS - 2016 include fundamental studies, insights into applied systems, and research areas with significant cross-over between various fields, such as femto- and attosecond lasers (including free-electron lasers), attosecond chronoscopy, and quantum dynamic imaging. The variety of targets and projectiles encourages interdisciplinary discussions and facilitates initiatives for future joint research projects on an international basis.

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August 23, 2016, Tuesday

16.00-20.00

Registration

18.00-20.00

Welcome reception

August 24, 2016, Wednesday

Photoprocesses I (Chair: Kiyoshi Ueda)

8.45-9.00	Opening	
9.00-9.30	Kevin Prince Elettra, Trieste, Italy	<i>Coherent control with fully coherent multicolor pulses</i>
9.30-10.00	Michael Meyer European XFEL, Hamburg, Germany	<i>Atomic photoionization in intense XUV and optical fields</i>
10.00-10.20	Nicolas Douguet Drake University, Des Moines, USA	<i>Multi-photon two-color ionization of atoms and ions by femtosecond pulses</i>
10.20-10.40	Giuseppe Sansone Politecnico di Milano, Italy	<i>Studies of electron correlation in photoionization of atoms and ions with large scale XUV facilities: FELs and ELI - ALPS</i>

Coffee Break 10.40-11.10

Photoprocesses II (Chair: Alexander Dorn)

11.10-11.30	Tsukasa Takanashi Tohoku University, Sendai, Japan	<i>Time-resolved measurement for ultrafast molecular dynamics of diiodomethane using X-ray free-electron laser from SACLA</i>
11.30-11.50	Zoltan Jurek DESY, CFEL, Germany	<i>Molecular dynamics modeling of FEL-irradiated fullerenes</i>
11.50-12.10	Kaoru Yamazaki Hokkaido University, Japan	<i>Toward the Coulomb explosion imaging of nano-molecules: Capturing the photo-induced dynamics of C₆₀ by an X-ray free electron laser</i>
12.10-12.30	Rebecca Boll DESY, Hamburg, Germany	<i>Molecular charge transfer dynamics initiated by intense X-ray pulses</i>

Lunch (12.30-14.00)

Photoprocesses III (Chair: Maria-Novella Piancastelli)

14.00-14.30	Marc Simon Sorbonne Universités, UPMC Université Paris 06, France	<i>Relaxation dynamics of core excited atoms and molecules probed by coincidences techniques and hard X-ray photoelectron spectroscopy</i>
14.30-14.50	Tatiana Marchenko Sorbonne Universités, UPMC, CNRS, Paris, France	<i>Electron and nuclear dynamics in deeply core-excited molecules</i>
14.50-15.10	Gregor Hartmann DESY, Hamburg, Germany	<i>Observation of strong non-dipole effects in sequential multi-photon ionization using VUV FEL radiation</i>

Coffee Break 15.10-15.40

Photoprocesses IV (Chair: Ugo Ancarani)

15.40-16.10	Bernard Piraux Université Catholique de Louvain, Belgium	<i>Laser-atom interactions: excited state population trapping in the adiabatic regime</i>
16.10-16.40	Kaoru Yamanouchi The University of Tokyo, Japan	<i>Laser assisted electron diffraction for femtosecond molecular imaging and electron behavior in the strong laser field</i>
16.40-17.00	Vladislav Serov Saratov State University, Russia	<i>Retroaction of a photoelectron in dissociative single photoionization of H₂</i>

17.00-18.30 **Poster session**

August 25, 2016, Thursday

Heavy particle collisions (Chair: Igor Bray)

9.00-9.30	Thomas Stöhlker Helmholtz-Institut Jena and GSI Darmstadt, Germany	<i>Electron capture in atomic scattering processes involving high-Z ions: The population of magnetic sublevels</i>
9.30-9.50	Alisher Kadyrov Curtin University, Perth, Australia	<i>Rearrangement collision processes in proton and positron scattering</i>
9.50-10.20	Markus Schöffler University Frankfurt, Germany	<i>Kinematically complete experiments on ion impact</i>
10.20-10.40	Yury Kozhedub Saint-Petersburg State University, Russia	<i>Coupled-channel calculation of radiation processes in low-energy heavy ion-atom collisions</i>

Coffee Break 10.40-11.10

11.10-12.00	In memory of Hans Kleinpoppen (A. Grum-Grzhimailo, N. Kabachnik, K. Ueda, S. Samarin, K. Bartschat, M. Meyer, et al)	
12.00-12.30	Roberto Rivarola Instituto de Física Rosario, Argentina	<i>Nanodosimetry in biological tissue interacting with ion beams</i>

Lunch (12.30-14.00)

Attosecond physics and imaging I (Chair: Danielle Dowek)

14.00-14.30	Renate Pazourek Vienna University of Technology, Austria	<i>Attosecond chronoscopy of photoemission</i>
14.30-14.50	Pascal Salières CEA Saclay, France	<i>Watching the buildup of an autoionizing resonance on an attosecond timescale</i>
14.50-15.10	Markus Klinker Universidad Autónoma de Madrid, Spain	<i>Mapping the dissociative ionization dynamics of molecular Nitrogen with attosecond time resolution</i>
15.10-15.30	Mathieu Gisselbrecht Lund University, Sweden	<i>Photoionization dynamics revisited at the attosecond timescale</i>

Coffee Break 15.30-16.00

Attosecond physics and imaging II (Chair: Yuri Popov)

16.00-16.30	Masahiko Takahashi Tohoku University, Sendai, Japan	<i>Progress towards time-resolved imaging of molecular orbitals and nuclear motions in momentum space</i>
16.30-16.50	Andrew Bulychev Joint Institute for Nuclear Research, Dubna, Russia	<i>Theory of laser-assisted (e, 2e) and (e, 3e) scattering on helium at large momentum transfer</i>

16.50-18.30 Poster session

August 26, 2016, Friday

Electron collisions (Chair: Klaus Bartschat)

9.00-9.30	Bratislav Marinković University of Belgrade, Serbia	<i>Electron spectroscopic studies of electron scattering by atoms and molecules</i>
9.30-10.00	Oleg Zatsarinny Drake University, Des Moines, USA	<i>Convergent B-spline pseudo-state close-coupling approach to electron-impact excitation and ionization of complex atoms</i>
10.00-10.30	Claude Dal Cappello Universite de Lorraine, Metz, France	<i>Double ionization of atoms and molecules by electron impact</i>

Coffee Break 10.30-11.00

Collisions with large molecules (Chair: Xiangjun Chen)

11.00-11.30	Darryl Jones Flinders University, Adelaide, Australia	<i>Electron impact ionization of large molecules</i>
11.30-11.50	Enliang Wang University of Science and Technology of China, Hefei, China	<i>Fragmentation dynamics of multi-charged molecules by electron impact</i>
11.50-12.10	Lokesh Tribedi Tata Institute of Fundamental Research, Mumbai, India	<i>Electron emission from PAH molecules, fullerene and plasmon excitation</i>
12.10-12.30	Alicja Domaracka CEA/CNRS/ENSICAEN/Unicaen, Caen, France	<i>Molecular growth processes in carbonaceous clusters induced by ion collisions</i>

Lunch 12.30 – 14.00

Collisions with surfaces I (Chair: Jamal Berakdar)

14.00-14.30	Frank Schumann MPI für Mikrostrukturphysik, Halle, Germany	<i>Energy relations of positron-electron pair emission from surfaces</i>
14.30-14.50	Wolfgang Werner TU Wien, Austria	<i>Dynamics of secondary electron emission from surfaces by Secondary Electron-Electron Energy Loss Coincidence Spectroscopy (SE2ELCS)</i>
14.50-15.10	Sergey Samarin The University of Western Australia, Perth, Australia	<i>Spin-polarized (e, 2e) spectroscopy of surfaces: symmetry consideration</i>

Coffee Break 15.10-15.40

Collisions with surfaces II (Chair: Alexander Rakhimov)

15.40-16.10	Andrey Solov'yov MBN Research Center, Frankfurt am Main, Germany	<i>Collisional processes with sensitizing nanoparticles</i>
16.10-16.40	Ekaterina Voronina Lomonosov Moscow State University, Russia	<i>Fluorine atoms interaction with the nanoporous materials: Experiment and ab initio simulation</i>
<i>General discussion and closing</i>		

19.00 Conference Dinner

**INVITED
TALKS**

Electron spectroscopic studies of electron scattering by atoms and molecules

B. P. Marinković*,¹*Institute of Physics Belgrade, Laboratory for Atomic Collision Processes,
University of Belgrade, Pregrevica 118, Belgrade, Serbia

Electron spectroscopic studies of electron scattering by atoms and molecules have been carried on at Belgrade Laboratory for Atomic Collision Processes (IPB) where the targets involve both atoms, metal vapours, small and large (bio)molecules. Three different types of electron spectrometers have been utilized in spectroscopic measurements: *a*) a hemispherical monochromator and analyzer (ESMA) [1]; *b*) e-gun and double cylindrical analyzer (UGRA) [2]; and *c*) high energy e-gun (2.5 keV) and Omicron high resolution hemispherical analyzer (OHRHA) [3]. Parameters of the experimental set-ups are summarized in Table 1.

1. Spectrometer ESMA is specially designed for measurements of metal vapours. The latest results on excitation of silver [4] and bismuth [5] atoms will be presented and put in perspective of recent theoretical and experimental studies. Differential cross sections (DCSs) for electron impact excitation of the $4d^9 5s^2 \ ^2D_{3/2}$ and $4d^{10} 6s^2 \ ^2S_{1/2}$ states of Ag atom were determined. Relative DCSs have been obtained by comparing intensities of these states relative to the resonant states at scattering angles from 10° to 150° and at electron impact energies in the range from 10 eV to 100 eV.

2. Electron spectroscopy for molecules has been performed with the aim of understanding the basic properties relevant for radiation damage [6] and the processes of fragmentation upon electron impact for the aim of FEBID (focused electron beam induced dissociation processes).

Most recently DCSs for elastic scattering have been obtained for halothane molecule (CF_3CHBrCl , 2-bromo-2-chloro-1,1,1-trifluoroethane) as one of the most extensively used halogenated anesthetics in medicine. DCSs were measured in the impact electron energy range from 50 eV to 300 eV while Electron Energy-Loss Spectra (EELS) were obtained at electron energies of 30, 50 and 250 eV at 20 degrees. The first absorption bands can be classified as a mixture of Rydberg series and

molecular valence transitions of ($\sigma^* \leftarrow n_{\text{Br}}$) and ($\sigma^* \leftarrow n_{\text{Cl}}$) character.

3. Ejected electron spectroscopy was performed on the apparatus OHRHA for all rare gas atoms [3,7,8]. Autoionization spectra and Auger states were carefully examined in the broad range of ejected electron energies (up to 240 eV) and at high impact electron energies, from 500 to 2000 eV.

Table 1. Parameters of IPB electron spectrometers.

app.	impact energy (eV)	angular range (deg.)	primary current (nA)	ultimate resolution (meV)
ESMA	10-100	0-150	10	28
UGRA	30-400	0-130	1,000	150
ORHA	10-2500	0-130	15,000	60

Acknowledgements

This work has been supported by MESTD project OI#171020 “Physics of collisions and photo processes in atomic, (bio)molecular and nanosized systems” of R. Serbia. Also, partial support from COST Actions CM1404 XLIC and CM1301 CELINA is acknowledged. The work has been also performed within the scope of bilateral project between Italy and Serbia of particular relevance (Grande Rilevanza) “Nanoscale insights in radiation damage”.

References

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August 23, 2016, Tuesday

16.00-20.00 Registration


18.00-20.00 Welcome reception

PROGRAM

<u>Time</u>	<u>August 24, 2016, Wednesday</u>	<u>August 25, 2016, Thursday</u>	<u>August 26, 2016, Friday</u>
8.45-9.00	Opening		
	<u>Photoprocesses I (Chair : Kiyoshi Ueda)</u>	<u>Heavy particle collisions (Chair: Igor Bray)</u>	<u>Electron collisions (Chair: Klaus Bartschat)</u>
9.00-9.30	Kevin Prince, Italy	9.00-9.30 Thomas Stöhlker, Germany	9.00-9.30 Bratislav Marinković, Serbia
9.30-10.00	Michael Meyer, Germany	9.30-9.50 Alisher Kadyrov, Australia	9.30-10.00 Oleg Zatsarinny, USA
10.00-10.20	Nicolas Douguef, USA	9.50-10.20 Markus Schöffler, Germany	10.00-10.30 Claude Dal Cappello, France
10.20-10.40	Guiseppe Sansone, Italy	10.20-10.40 Yury Kozhedub, Russia	
10.40-11.10	Coffee Break	10.40-11.10	10.30-11.00
	<u>Photoprocesses II (Chair : Alexander Dorn)</u>	<u>Coffee Break</u>	<u>Coffee Break</u>
			<u>Collisions with large molecules (Chair: Xiangjun Chen)</u>
11.10-11.30	Tsukasa Takanashi, Japan	11.10-12.00 In memory of Hans Kleinpoppen (A.Grüm-Grzhimailo, N.Kabachnik, K.Ueda, S.Samarin, K.Bartschat, M. Meyer, et al)	11.00-11.30 Darryl Jones, Australia
11.30-11.50	Zoltan Jurek, Germany	12.00-12.30 Roberto Rivarola, Argentina	11.30-11.50 Enliang Wang, China
11.50-12.10	Kaoru Yamazaki, Japan		11.50-12.10 Lokesh Tribedi, India
12.10-12.30	Rebecca Boll, Germany		12.10-12.30 Alicja Domaracka, France
12.30-14.00	Lunch		
	<u>Photoprocesses III (Chair : Maria-Novella Piancastelli)</u>	<u>Attosecond physics and imaging I (Chair : Danielle Dowek)</u>	<u>Collisions with surfaces I (Chair: Jamal Berakdar)</u>
14.00-14.30	Marc Simon, France	14.00-14.30 Renate Pazourek, Austria	14.00-14.30 Frank Schumann, Germany
14.30-14.50	Tatiana Marchenko, France	14.30-14.50 Pascal Salières, France	14.30-14.50 Wolfgang Werner, Austria
14.50-15.10	Gregor Hartmann, Germany	14.50-15.10 Jesús González-Vázquez, Spain	14.50-15.10 Sergey Samarin, Australia
15.10-15.40	Coffee Break	15.30-16.00	15.10-15.40
	<u>Photoprocesses IV (Chair : Ugo Ancarani)</u>	<u>Coffee Break</u>	<u>Coffee Break</u>
			<u>Collisions with surfaces II (Chair: Alexander Rakhimov)</u>
15.40-16.10	Bernard Piraux, Belgium	16.00-16.30 Masahiko Takahashi, Japan	15.40-16.10 Andrey Solov'yov, Germany
16.10-16.40	Kaoru Yamanouchi, Japan	16.30-16.50 Andrew Bulychev, Russia	16.10-16.40 Ekaterina Voronina, Russia
16.40-17.00	Vladislav Serov, Russia		General discussion and closing
17.00-18.30	Poster session	16.50-18.30	19.00
		Poster session	Conference Dinner



The International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces MPS-2016

 23-26 August
2016

Lomonosov Moscow State
University, Moscow,
Russia

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The International Conference on Many Particle Spectroscopy of Atoms, Molecules, Clusters and Surfaces (MPS 2016) will take place in Moscow, Russia during August 23 until August 26, 2016 in Lomonosov Moscow State University, which organizes this conference together with the "CTO Congress" company.

MPS started as an international conference being held in between the International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC), which is organized every second year. The most recent MPS were held in Metz, France (2014), in Berlin, Germany (2012), in Sendai, Japan (2010), in Paris, France (2008), in Roma, Italy (2006).

Scope

The scientific program of this biennial international conference is focused on current hot topics in the field of interaction of various projectiles (photons, charged and neutral light and heavy particles) with atoms, molecules, clusters and surfaces. The various nature of targets and projectiles helps to encourage interdisciplinary discussions and initiatives for future joint research projects on an international basis. The official language of the conference is English.