

**International Symposium on
(e,2e), Double Photo-ionization
and Related Topics and 18th
International Symposium on
Polarization and Correlation in
Electronic and Atomic Collisions**

Donostia-San Sebastian, Spain
30 July – 1 August 2015

ISBN: 978-1-7138-2955-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

For any questions regarding copyright, please contact Donostia International Physics Center (DIPC)
All rights reserved.

Printed with permission by Curran Associates, Inc. (2021)

For permission requests, please contact Donostia International Physics Center (DIPC)
at the address below.

Donostia International Physics Center (DIPC)
Paseo Manuel de Lardizabal, 4
20018 Donostia-San Sebastian (Gipuzkoa)
Spain

Phone: +34 943 01 53 68
Fax: +34 943 01 56 00

<http://dips.ehu.es>

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

BOOK INDEX

- Committees.....	5
- Location and Venue.....	7
- Scientific Program.....	11
Common Sessions.....	13
Parallel Session: Electrons/Ions.....	14
Parallel Session: Photons.....	17
List of Posters.....	21
- Abstracts.....	25
Plenary Lectures.....	27
Invited Talks.....	33
Oral Contributions.....	69
Posters.....	95
- Program at a glance.....	131

COMMON SESSIONS AND ACTIVITIES

REGISTRATION

Wednesday July 29th (17.30h-19.30h) and Thursday July 30th (8.00h-8.45h)

OPENING

Thursday July 30th:

8.45h-9.00h: Opening by Ricardo Díez Muiño and Nikolay Kabachnik

PLENARY TALKS

Thursday July 30th

Chairman: Ricardo Díez Muiño

- 29 **9.00h-9.45h: PL1.- Lorenz S. Cederbaum (University of Heidelberg, Germany)**
Interatomic (Intermolecular) Coulombic Decay and its Exploration by Free-Electron-Lasers

Friday July 31st

Chairman: Nikolay Kabachnik

- 30 **9.00h-9.45h: PL2.- Anatoli Kheifets (Australian National Univ., Canberra, Australia)**
Strong field atomic ionization with linear/circular polarized light: Spectra, Cusps and Time delay

Saturday August 1st

Chairman: Don Madison

- 31 **9.00h-9.45h: PL3.- Giovanni Stefani (Università Roma Tre, Rome, Italy)**
Direct and resonant double photoionization in solids

POSTER SESSION

Thursday July 30th

18.30h-20.00h: (Drinks and snacks will be served)

CONFERENCE DINNER

Friday July 31st

20.30h: Restaurante Ni Neu (Paseo de la Zurriola 1, Donostia – San Sebastián)

PARALLEL SESSION: ELECTRONS/IONS

Thursday July 30th

Chairman: Klaus Bartschat

35 **10.00h-10.30h: e-I1.- Daniel Fischer (Missouri S&T, Rolla MO, USA)**

Collision dynamics studied with a polarized MOT target

36 **10.30h-11.00h: e-I2.- Leigh R. Hargreaves (California St. Univ., Fullerton CA, USA),**

Unusual angular momentum transfer in electron-impact excitation of atoms and molecules

COFFEE BREAK

Chairman: James Colgan

37 **11.30h-12.00h: e-I3.- Klaus Bartschat (Drake University, Des Moines IA, USA)**

Non-perturbative calculations for electron-impact ionization of complex atoms

71 **12.00h-12.20h: e-O1.- Xueguang Ren (Phys.-Tech. Bundes., Braunschweig, Germany)**

Low-energy (67 eV) electron-impact induced interatomic coulombic decay of argon dimer

72 **12.20h-12.40h: e-O2.- Baoren Wei (Fudan University, Shanghai, China)**

Fragmentation mechanisms for Methane induced by 55 eV, 75 eV and 100 eV electron impact

73 **12.40h-13.00h: e-O3.- Stanislav Tashenov (University of Heidelberg, Germany)**

First observation of coherence in a highly charged ion

LUNCH

Chairman: Xiangjun Chen

38 **15.15h-15.45h: e-I4.- Béla Paripás (University of Miskolc, Hungary)**

Angle-dependent (e,2e) study of state-to-state interference between autoionizing states of He

39 **15.45h-16.15h: e-I5.- Nicholas Martin (University of Kentucky, Lexington KY, USA)**

Out-of-plane (e,2e) experiments on He autoionization levels

74 **16.15h-16.35h: e-O4.- Peter Koval (DIPC, San Sebastian, Spain)**

Iterative calculation of electron energy loss spectra

75 **16.35h-16.55h: e-O5.- Filippo Morini (Hasselt University, Diepenbeek, Belgium)**

The ground state nuclear dynamics of dimethyl ether in momentum space

COFFEE BREAK

Chairman: Béla Paripás

- 40 **17.30h-18.00h: e-I6.- James Colgan (Los Alamos Nat. Lab., Los Alamos NM, USA)**
Triple differential cross sections for the electron-impact ionization of laser-excited Mg: the perpendicular plane cross section
- 41 **18.00h-18.30h: e-I7.- Lorenzo Ugo Ancarani (Université de Lorraine, Metz, France)**
Sturmian approach for ionization processes: applications and perspectives

Friday July 31st

Chairman: Alexander Dorn

- 42 **10.00h-10.30h: e-I8.- Michael Schulz (Missouri S&T, Rolla MO, USA)**
Fully differential study of coherence and interference effects in ionization of H₂ by proton impact
- 43 **10.30h-11.00h: e-I9.- Shaofeng Zhang (Institute of Modern Physics, Lanzhou, China)**
"Double-slit" interferences observed in dielectronic transitions in collisions between hydrogen molecular ion and helium atom

COFFEE BREAK

Chairman: Masahiko Takahashi

- 44 **11.30h-12.00h: e-I10.- Masakazu Yamazaki (Tohoku University, Sendai, Japan)**
Towards making the molecular orbital movies by time-resolved (e,2e) electron momentum spectroscopy
- 76 **12.00h-12.20h: e-O6.- Mariusc Piwiński (Nicolaus Copernicus Univ., Toruń, Poland)**
Inelastic e-Cd and e-Zn collisions
- 77 **12.20h-12.40h: e-O7.- Chenzhong Dong (Northwest Normal Univ., Lanzhou, China)**
Influence of the higher order effects on the polarization and angular distribution of the radiation following electron-impact excitation process

LUNCH

Chairman: Allen Landers

- 45 **15.15h-15.45h: e-I11.- Allan Stauffer (York University, Toronto, Canada)**
Ionization of laser-excited atoms: the shape of the cross sections
- 46 **15.45h-16.15h: e-I12.- Andrey Surzhikov (Helmholtz-Institut, Jena, Germany)**
Interaction of twisted light with atomic and molecular targets
- 78 **16.15h-16.35h: e-O8.- Ladislau Nagy (Babeş-Bolyai University, Cluj, Romania)**
Projectile coherence -- the transition between the semiclassical and the quantum method
- 79 **16.35h-16.55h: e-O9.- Yew Kam Ho (Academia Sinica, Taipei, Taiwan)**
Electron-electron orbital entanglement in two-electron ions around the critical charge region

COFFEE BREAK

Chairman: Allan Stauffer

- 47 **17.30h-18.00h: e-I13.- Allen Landers (Auburn University AL, USA),**
Ion-momentum imaging of dissociative-electron-attachment dynamics in CO₂, N₂O, HCCH
and CF₄
- 48 **18.00h-18.30h: e-I14.- Omar Ariel Fojón (Instituto de Física de Rosario, Argentina)**
Coherent emission from diatomic molecules: from femto- to atto-seconds

Saturday August 1st

Chairman: Michael Schulz

- 49 **10.00h-10.30h: e-I15.- Don Madison (Missouri S&T, Rolla MO, USA)**
Accuracy of theory for calculating 3-Body and 4-Body fully differential cross sections for
electron-impact ionization of atoms and molecules
- 50 **10.30h-11.00h: e-I16.- Xiangjun Chen (Univ. of Science and Technology, Hefei, China)**
Three-body fragmentation of simple molecules induced by electron impact multiple
ionizations

COFFEE BREAK

Chairman: Lorenzo Ugo Ancarani

- 51 **11.30h-12.00h: e-I17.- Alexander Dorn (MPI for Nucl. Physics, Heidelberg, Germany)**
A thorough study of Young-type interferences in (e,2e) on H₂ molecules with known spatial
alignment
- 80 **12.00h-12.20h: e-O10.- Juana L. Gervasoni (Centro Atómico Bariloche, Argentina)**
Effects of the sudden electron-hole pair creation and of the life time of the residual hole on
plasmon excitations in surfaces
- 81 **12.20h-12.40h: e-O11.- Károly Tőkési (Inst. Nuclear Research, Debrecen, Hungary)**
Optical constants of iron derived from reflection electron energy-loss spectra

LUNCH

PARALLEL SESSION: PHOTONS

Thursday July 30th

Chairman: Maria Novella Piancastelli

- 52 **10.00h-10.30h: ph-I1.- Emma Sokell (University College Dublin, Ireland)**
Coincidence photoelectron measurements following 2p photoionization in Mg
- 53 **10.30h-11.00h: ph-I2.- Kiyoshi Ueda (Tohoku University, Sendai, Japan)**
XFEL-induced ultrafast electron and molecular dynamics

COFFEE BREAK

Chairman: Emma Sokell

- 54 **11.30h-12.00h: ph-I3.- John Furst (University of Newcastle, Ourimbah, Australia)**
Alignment and Orientation of N_2^+
- 82 **12.00h-12.20h: ph-O1.- Miron Ya. Amusia (The Hebrew University, Jerusalem, Israel)**
One photon-two electron ionization in atoms and endohedrals – simplicity and complexity
- 83 **12.20h-12.40h: ph-O2.- Armin Scrinzi (Ludwig Maximilians Univ., Munich, Germany)**
Single- and double emission from multi-electron systems: How to compute IR double emission and solve the CO_2 mystery
- 84 **12.40h-13.00h: ph-O3.- Yuri V. Popov (Moscow State University, Moscow, Russia)**
New look at the strong field approximation in laser-matter interactions

LUNCH

Chairman: Kiyoshi Ueda

- 55 **15.15h-15.45h: ph-I4.- Alicia Palacios (Universidad Autónoma de Madrid, Spain)**
Decoding attosecond electron-nuclear dynamics in molecules by means of XUV-IR and XUV-XUV pump-probe schemes
- 56 **15.45h-16.15h: ph-I5.- Kirsten Schnorr (MPI für Kernphysik, Heidelberg, Germany)**
Electron Rearrangement Dynamics in Dissociating Iodine Molecules
- 85 **16.15h-16.35h: ph-O4.- Oksana Travnikova (LCPMR, Paris, France)**
Multi-step ultrafast fragmentation of the third row hydrides following K-shell excitation and ionisation
- 86 **16.35h-16.55h: ph-O5.- David Ayuso (Universidad Autónoma de Madrid, Spain)**
Ultrafast electron dynamics in phenylalanine initiated by attosecond pulses

COFFEE BREAK

Chairman: Alicia Palacios

- 57 **17.30h-18.00h: ph-I6.- Renaud Guillemin (Univ. Pierre et Marie Curie, Paris, France)**
Exploring deep-core photoionization: ion-electron correlation effects in the 1 to 10 keV x-ray region
- 58 **18.00h-18.30h: ph-I7.- Li Fang (University of Texas, Austin, TX USA)**
Photoionization induced fragmentation of glycine molecule and endohedral fullerenes $\text{Ho}_3\text{N}@C_{80}$ molecule

Friday July 31st

Chairman: Igor Bray

- 59 **10.00h-10.30h: ph-I8.- Artem Rudenko (Kansas State Univ., Manhattan, KS, USA)**
Electronic and nuclear dynamics triggered by ultra-intense soft and hard X-rays
- 60 **10.30h-11.00h: ph-I9.- Kyo Nakajima (JASRI, Hyogo, Japan)**
Photoelectron diffraction from laser-aligned molecules using an x-ray free-electron laser

COFFEE BREAK

Chairman: Tommaso Mazza

- 61 **11.30h-12.00h: ph-I10.- Olga Smirnova (Max Born Institute, Berlin, Germany)**
Attosecond Spectroscopy: from measuring ionization times to time-resolving chiral response
- 87 **12.00h-12.20h: ph-O6.- Alvaro Jiménez-Galán (Univ. Autónoma de Madrid, Spain)**
Time delay anisotropy in photoelectron emission from the isotropic ground state of helium
- 88 **12.20h-12.40h: ph-O7.- Ya-Wei Liu (Univ. of Science and Technology, Hefei, China)**
Optical oscillator strengths of the valence-shell excitations of molecular nitrogen measured by the dipole (γ,γ) method
- 89 **12.40h-13.00h: ph-O8.- Lin-Fan Zhu (Univ. of Science and Technology, Hefei, China)**
Squared form factors for the $A^1\Pi$ and $B^1\Sigma^+$ vibronic bands of carbon monoxide studied by high-resolution inelastic x-ray scattering

LUNCH

Chairman: Alexey Grum-Grzhimaylo

- 62 **15.15h-15.45h: ph-I11.- Tommaso Mazza (European XFEL, Hamburg, Germany)**
Circular dichroism in two-color multi-photon ionization of rare-gas atoms
- 63 **15.45h-16.15h: ph-I12.- Andrey K. Kazansky (DIPC, San Sebastián, Spain)**
Dichroism in two-color ionization of atoms by short pulses
- 90 **16.15h-16.35h: ph-O9.- Luca Argenti (Universidad Autónoma de Madrid, Spain)**
Modulation of Attosecond Beating in Resonant Two-Photon Ionization

- 91 **16.35h-16.55h: ph-O10.- Ralph Püttner(Freie Universität Berlin, Germany)**
The $1s^{-1}2s^{-1}$ and $1s^{-1}2p^{-1}$ double core-hole shake-up satellites in Argon

COFFEE BREAK

Chairman: Armin Scrinzi

- 64 **17.30h-18.00h: ph-I13.- Oleg S. Vasyutinskii (Ioffe Institute, St. Petersburg, Russia)**
Determination of spin-polarized H atoms produced in molecular photodissociation
- 65 **18.00h-18.30h: ph-I14.- Andreas Fischer (MPI für Kernphysik, Heidelberg, Germany),**
Molecular dynamics on laser-controlled transition states

Saturday August 1st

Chairman: Paola Bolognesi

- 66 **10.00h-10.30h: ph-I15.- Lorenzo Avaldi (CNR – Ist. Strutt. della Materia, Roma, Italy)**
Fragmentation of halopyrimidines and halouraciles by photoionization and ion impact
- 67 **10.30h-11.00h: ph-I16.- Laurent Nahon (Synchrotron SOLEIL, Saint Aubin, France)**
Gas phase targets in interaction with Circularly-Polarized Light: Molecular polarimetry and chiroptical effects in photoionization

COFFEE BREAK

Chairman: Lorenzo Avaldi

- 68 **11.30h-12.00h: ph-I17.- Christophe Nicolas (Synchr. SOLEIL, Saint Aubin, France)**
Momentum Exchange in Molecular Systems
- 92 **12.00h-12.20h: ph-O11.- Yaroslav Pavlyukh (Martin-Luther-Univ., Halle, Germany)**
Keldysh nonequilibrium Green's function vs. Feshbach projection operator approach for plasmon-assisted photoemission
- 93 **12.20h-12.40h: ph-O12.- Denis Iablonskyi (Tohoku University, Sendai, Japan)**
Interatomic Coulombic Decay Processes after Multiple Valence Excitations in Ne Clusters

LUNCH

POSTER SESSION

The poster session is scheduled on July 30th in the evening (6.30pm-8.00pm). Poster boards and scotch tape will be available since the morning of the first day. For each poster, the display space in the poster boards will be at least A0 size (841 x 1189 mm). The poster boards will be kept during the full duration of the symposia. We recommend the poster to be left at the boards until the end of the meeting.

LIST OF POSTER CONTRIBUTIONS

- 97 **P1.-** Photoelectron angular distributions and correlations in sequential two-photon double ionization by circularly polarized XUV radiation
Alexei N. Grum-Grzhimailo, Elena V. Gryzlova, Ekaterina I. Staroselskaya
- 98 **P2.-** Theory of ultrafast x-ray photoelectron diffraction
Shota Tsuru, Kyo Nakajima, Tokuei Sako, Takashi Fujikawa and Akira Yagishita
- 99 **P3.-** Two-photon triple ionization of lithium
James Colgan, M. S. Pindzola
- 100 **P4.-** Dressing Effects in the Attosecond Transient Absorption Spectra of Doubly-Excited States in Helium
L. Argenti, A. Jiménez-Galán, C. Marante, C. Ott, T. Pfeifer, F. Martín
- 101 **P5.-** Excitation of vibrational modes in the ionization of water molecule by XUV/X-ray radiation
Selma Engin, Jesús González-Vázquez, Inés Corral, Alicia Palacios, David Ayuso, Piero Decleva, and Fernando Martín
- 102 **P6.-** Photoionization time delays in molecular hydrogen.
R. Bello, Sebastian Heuser, A. Palacios, Matteo Lucchini, Lukas Gallmann, Claudio Cirelli, F. Martín, Ursula Keller
- 103 **P7.-** Mapping ultrafast dynamics of highly excited D_2^+ by ultrashort XUV pump - IR probe laser schemes
R. Bello, L. S. Martin, C. W. Hogle, A. Palacios, J. L. Sanz-Vicario, X. M. Tong, F. Martín, M. Murnane, H. C. Kapteyn and P. Ranitovic

- 104 **P8.-** Finite element DVR method for molecular single and double ionization by strong laser pulses
Denis Jelovina, Johannes Feist, Fernando Martín, and Alicia Palacios
- 105 **P9.-** Merging quantum chemistry packages with B-splines for the multichannel scattering problem.
Carlos Marante, Jesús González, Inés Corral, Markus Klinker, Luca Argenti, Fernando Martín
- 106 **P10.-** Ultrafast electron dynamics in phenylalanine initiated by attosecond pulses
F. Calegari, D. Ayuso, A. Trabattoni, L. Belshaw, S. De Camillis, S. Anumula, F. Frassetto, L. Poletto, A. Palacios, P. Decleva, J. Greenwood, F. Martín and M. Nisoli
- 107 **P11.-** Vibrationally resolved B 1s photoionization cross section of BF_3
D. Ayuso, M. Kimura, K. Kooser, M. Patanen, E. Plesiat, L. Argenti, S. Mondal, O. Travnikova, K. Sakai, A. Palacios, E. Kukk, P. Decleva, K. Ueda, F. Martín, C. Miron
- 108 **P12.-** Time delay anisotropy in photoelectron emission from the isotropic ground state of helium
S. Heuser, A. Jiménez-Galán, C. Cirelli, M. Sabbar, R. Boge, M. Lucchini, L. Gaallmann, I. Ivanov, A. Kheifets, J. M. Dahlström, E. Lindroth, L. Argenti, F. Martín, U. Keller
- 109 **P13.-** Phase Measurement of a Fano Resonance Using Tunable Attosecond Pulses
A. Jiménez-Galán, M. Kotur, D. Guénot, D. Kroon, E. W. Larsen, M. Louisy, S. Bengtsson, M. Miranda, J. Mauritsson, C. L. Arnold, S. E. Canton, M. Gisselbrecht, T. Carette, J. M. Dahlstrom, E. Lindroth, A. Maquet, L. Argentiz, F. Martín, A. L'Huillier
- 110 **P14.-** Temporal and spatial interferences in the laser-assisted photoionization of diatomic molecules
Diego I.R. Boll, Omar A. Fojón
- 111 **P15.-** Molecular-frame photoelectron angular distributions for carbon 1s photoemission of methyl iodide
H. Fukuzawa, S. Yamada, Y. Ito, T. Tachibana, T. Takanashi, Y. Sakakibara, K. Nagaya, T. Nishiyama, T. Sakai, M. Yao, M. Oura, N. Saito, M. Stener, P. Decleva, and K. Ueda
- 112 **P16.-** Subfemtosecond dynamics in dissociating core-excited CH_3I molecules studied with resonant Auger spectroscopy
T. Marchenko, G. Goldsztejn, L. Journal, R. Guillemin, O. Travnikova, A. F. Lago, D. Céolin, J.P. Rueff, R. Püttner, M. N. Piancastelli, and M. Simon

- 113 **P17.-** Plasmon excitation due to Auger photoemission spectroscopy from Fe-Si alloys
Juana L. Gervasoni, Monika Jenko and Matjaž Godec
- 114 **P18.-** Generalized Sturmian Function approach to the two-photon ionization of atoms
A.I. Gómez, G. Gasaneo, D.M. Mitnik and F.D. Colavecchia
- 115 **P19.-** Photoionization of CH₄, H₂O and NH₃: a Sturmian approach
C. M. Granados–Castro, L. U. Ancarani, G. Gasaneo, D. M. Mitnik
- 116 **P20.-** Electron impact ionization of CH₄, H₂O and NH₃: a Sturmian approach
C. M. Granados–Castro, L. U. Ancarani, G. Gasaneo, D. M. Mitnik
- 117 **P21.-** Convergent Close Coupling double ionization amplitude extraction with Hyperspherical Sturmian Functions
M.J. Ambrosio, D.M. Mitnik, G. Gasaneo, J.M. Randazzo, I. Bray and L.U. Ancarani
- 118 **P22.-** Investigation of triple differential cross section for electron impact ionization of methane molecule
Mevlut Dogan, Murat Yavuz, Zehra Nur Ozer, Nimet Isik, Semiha Bahceli, Adnan Naja
- 119 **P23.-** (e, 2e) coincidence studies for simultaneous excitation–ionization to He⁺⁽ⁿ⁼²⁾ by electron impact
Mevlut Dogan, Albert Crowe, Oleg Zatsarinny, Klaus Bartschat
- 120 **P24.-** Significance of projectile scattering angle on the observation of Young's type interference effects for diatomic molecules
Zehra Nur Ozer, Hari Chaluvadi, Mevlut Dogan, Don Madison
- 121 **P25.-** Investigation of electron impact double excitation of the autoionizing states of Helium by (e, 2e) experiments
Melike Ulu, Omer Sise, Ali Alpergun, Nurcin Karadeniz, Mevlut Dogan and Albert Crowe
- 122 **P26.-** Dalitz plot analysis of three-body fragmentation dynamics of CO₂^{q+} (q = 3; 4)
Enliang Wang, Xu Shan, Zhenjie Shen, Maomao Gong, Yaguo Tang, Xiangjun Chen
- 123 **P27.-** Three-body fragmentation dynamics of OCS⁴⁺ investigated by 500 eV electron collision
ZhenJie Shen, MaoMao Gong, EnLiang Wang, Xu Shan, XiangJun Chen

- 124 **P28.-** Correlation and quantum entanglement in Rydberg states of the helium atom
Yen-Chang Lin, Te-Kuei Fang, Yew Kam Ho
- 125 **P29.-** Effect of orthogonalization on total ionization cross sections by electron impact:
Application to small molecules
S. Nehaoua, S. Houamer, C. Dal Cappello, M. Chinoune, A. Galstyan and A. C. Roy
- 126 **P30.-** Non-perturbative B-spline R-matrix with pseudo-states calculations for electron-
impact excitation-ionization of helium to the $n = 3$ states
Oleg Zatsarinny and Klaus Bartschat
- 127 **P31.-** Mechanisms of Chiral Sensitivity in Electron-Molecule Interactions
J.M. Dreiling, F.W. Lewis, and T.J. Gay
- 128 **P32.-** Kinematically complete low-energy (e, 2e) study of neon: Internormalized triple-
differential cross sections in 3D kinematics
*XueGuang Ren, Sadek Amami, Oleg Zatsarinny, Thomas Pflüger, Marvin Weyland, Woon
Yong Baek, Hans Rabus, Klaus Bartschat, Don Madison, Alexander Dorn*
- 129 **P33.-** High resolution electron ejected spectra of He, Ne and Ar by high energy electrons
B. P. Marinković, J. J. Jureta, and A. R. Milosavljević