

## DATOS BIOGRAFICOS

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### A. VITA

#### Educación:

- 1997      Ph.D. en Física (**Summa cum Laude**), The Hebrew University, Jerusalem, Israel.
- 1991      M.S. en Física (**Magna cum Laude**), The Hebrew University, Jerusalem, Israel.
- 1989      B.Sc. en Física y Matemáticas (**cum Laude**), The Hebrew University, Jerusalem, Israel.
- 1980      Técnico en Electrónica, Escuela Técnica ORT, Buenos Aires, Argentina.

#### Experiencia Profesional:

- 2011 – 2011    *Visiting Professor*, NASA University Research Center for Aerospace Device Research and Education, North Carolina Central University, NC USA.
- 2009 – 2009    *Profesor Adjunto*, Departamento de Física, Universidad de Buenos Aires, Argentina.
- 2007 –          *Investigador Independiente*, CONICET, Instituto de Astronomía y Física del Espacio, Buenos Aires, Argentina.
- 2004 – 2007    *Investigador Adjunto*, CONICET, Instituto de Astronomía y Física del Espacio, Buenos Aires, Argentina.
- 2002 –          *Jefe de Trabajos Prácticos*, Departamento de Física, Universidad de Buenos Aires, Argentina.
- 2002 –          *Visiting Research Fellow in Physics*, Rollins College, Winter Park, Florida, USA.
- 2000 – 2002    *Research Fellow* con Prof. D. C. Griffin, Physics Department, Rollins College, Winter Park, Florida, USA. Beca sustentada por Los Alamos National Laboratory, USA.
- 1997 – 2000    *Postdoctoral Research Associate* con Prof. M. S. Pindzola y F. R. Robicheaux, Atomic Physics Department, Auburn University, Alabama, USA. Beca sustentada por el Departamento de Energía, USA.
- 1996 – 1996    *Postdoctoral Research Associate* con Prof. M. Paul, Weizmann Institute, Rehovot, Israel.
- 1990 – 1997    *Graduate Research Assistant* con Prof. J. L. Schwob, The Hebrew University, Jerusalem, Israel.
- 1990 – 1996    *Teaching Assistant*, The Hebrew University, Jerusalem, Israel.

#### Experiencia Docente:

- 2010 – 2010    Profesor Invitado, *Introducción a la Computación en Paralelo*, Universidad Nacional de Salta, Argentina.
- 2009 – 2009    *Profesor Adjunto, Ciclo Básico Común*, Departamento de Física, Universidad de Buenos Aires, Argentina.
- 2006 – 2010    Profesor Invitado, *Introducción a los Métodos Numéricos en Física*, Universidad Nacional del Sur, Bahía Blanca, Argentina.
- 2003 –          Jefe de Trabajos Prácticos, *Física 4 - Termodinámica y Principios de Física Cuántica, Física Teórica II - Física Cuántica*, Departamento de Física, Universidad de Buenos Aires, Argentina.
- 2002 – 2002    Profesor, *Modern Physics*, Rollins College, Winter Park, Florida, USA.
- 1992 – 1996    Instructor, *Physics Laboratory III*, The Hebrew University.
- 1991 – 1992    Instructor, *Atoms and Molecules*, The Hebrew University.
- 1990 – 1991    Instructor, *Physics Laboratory I*, The Hebrew University.

**Premios y Distinciones:**

- 1996 Prize for the best student presentation to the 10<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, San Francisco, USA.
- 1995 Yiglom Grant for excellence in research, Israel.

**B. INVESTIGACION****Areas de Interés:**

- Física Atómica: Colisiones electrón-ion. Excitación, ionización y recombinación por impacto de electrones. Métodos perturbativos (ondas distorsionadas) y de canales acoplados (*R*-matrix). Estructura atómica y correlación. Bases Sturmianas. Coordenadas hyperesféricas.
- Física Computacional: Cálculos de gran escala. Implementación en computadoras paralelas masivas. Algoritmos de propagación temporal. Métodos variacionales. Métodos espectrales.
- Física del Plasma: Espectroscopía de Plasmas. Modelación de Plasmas. Generación de datos atómicos para astrofísica y fusión.

**C: ANTECEDENTES CIENTÍFICOS****C1. Publicaciones con Arbitraje en Revistas Internacionales:**

- [1] J. Oreg, W. Goldstein, P. Mandelbaum, D. Mitnik, E. Meroz, J.L. Schwob, A. Bar-Shalom, “Distorted-wave calculations of the electron-impact excitation-autoionization processes from the ground state of highly ionized GaI-like ions through  $\Delta n=1$  inner-shell excitations”, *Phys. Rev. A* **44**, 1741–1749 (1991).
- [2] A. Zigler, P. Mandelbaum, J.L. Schwob, and D. Mitnik, “Analysis of the X-Ray spectra emitted by laser-produced plasma of highly ionized Lanthanum and Praseodymium in the 8.4 to 12.0 Å wavelength range”, *Phys. Scr.*, **50**, 61–67 (1994).
- [3] D. Mitnik, P. Mandelbaum, J.L. Schwob, J. Oreg, A. Bar-Shalom, and W. Goldstein, “Excitation-autoionization through  $3d-4l$  inner-shell excitations in Cu- to Kr-like ions and the effect on fractional-ion-abundance balance in coronal plasmas”, *Phys. Rev. A* **50**, 4911–4929 (1994).
- [4] P. Mandelbaum, D. Mitnik, E. Behar, R. Doron, and J.L. Schwob, “Excitation-autoionization, dielectronic recombination and line intensities in highly ionized CuI-like ions”, *J. Quant. Spectrosc. Radiat. Transfer*, **54**, 261–269 (1995).
- [5] D. Mitnik, P. Mandelbaum, J.L. Schwob, J. Oreg, A. Bar-Shalom, and W. Goldstein, “Excitation-autoionization cross sections and rate coefficients of Cu-like Ions”, *Phys. Rev. A* **53**, 3178–3188 (1996).
- [6] D. Mitnik, P. Mandelbaum, J.L. Schwob, J. Oreg, and A. Bar-Shalom, “Excitation-autoionization cross sections and rate coefficients of Zn-like Ions”, *Phys. Rev. A* **55**, 307–317 (1996).
- [7] M.S. Pindzola, D.M. Mitnik, J.A. Shaw, D.C. Griffin, N.R. Badnell, H.P. Summers, and D.R. Shultz, “Electron-impact ionization of atomic ions in the Na isoelectronic sequence”, *Phys. Scripta* **57**, 514–518 (1998).
- [8] D.M. Mitnik, M.S. Pindzola, F. Robicheaux, N.R. Badnell, O. Uwira, A. Müller, A. Frank, J. Linkemann, W. Spies, N. Angert, P.H. Mokler, R. Becker, M. Kleinod, S. Ricz, and L. Empacher, “Dielectronic recombination of  $U^{28+}$  atomic ions”, *Phys. Rev. A* **57**, 4365–4372 (1998).
- [9] D.C. Griffin, D.M. Mitnik, M.S. Pindzola, and F. Robicheaux, “Intermediate-coupling calculations of the effects of interacting resonances on dielectronic recombination in a static electric field”, *Phys. Rev. A* **58**, 4548–4555 (1998).
- [10] D.M. Mitnik, J.A. Shaw, M.S. Pindzola, D.C. Griffin, and N.R. Badnell, “Electron-impact ionization of  $Fe^{14+}$  and other atomic ions in the Mg isoelectronic sequence”, *Comp. Phys. Comm.* **114**, 368–377 (1998).
- [11] D.M. Mitnik, M.S. Pindzola, and N.R. Badnell, “Total and Partial Recombination Cross Sections for  $F^{6+}$ ”, *Phys. Rev. A* **59**, 3592–3600 (1999).
- [12] M.S. Pindzola, D.M. Mitnik and F. Robicheaux, “Electron-impact double ionization of a model Helium atom”, *Phys. Rev. A* **59**, 4390–4397 (1999).
- [13] D.M. Mitnik, M.S. Pindzola, D.C. Griffin, and N.R. Badnell, “Electron-impact ionization of  $C^{3+}$  using the  $R$ -matrix pseudo-state method”, *J. Phys. B* **32**, L479–485 (1999).
- [14] D. Berkovits, O. Heber, J. Klein, D. Mitnik, and M. Paul, “Photodissociation of the free  $BeC_6^{2-}$  dianion”, *Nucl. Instr. and Meth. in Phys. Res. B* **172**, 350–354 (2000).
- [15] D.M. Mitnik, M.S. Pindzola, and N.R. Badnell, “Dielectronic recombination of  $Pb^{79+}$  atomic ions at high spectral resolution”, *Phys. Rev. A* **61**, 022705 (2000).

- [16] M.S. Pindzola, D.M. Mitnik, J. Colgan, and D.C. Griffin, “Electron–impact ionization of  $\text{Li}^+$ ”, *Phys. Rev. A* **61**, 052712 (2000).
- [17] D.M. Mitnik, M.S. Pindzola, and D.C. Griffin, “Influence of atomic radiative and collisional processes on the plasma modeling of  $\text{Mg}^{10+}$  at low electron densities”, *Phys. Rev. A* **62**, 062711 (2000).
- [18] M.S. Pindzola, D.M. Mitnik, and F. Robicheaux, “ $T$ –matrix calculations for the electron–impact ionization of hydrogen in the Temkin–Poet model”, *Phys. Rev. A* **62**, 062718 (2000).
- [19] J. Colgan, D.M. Mitnik, and M.S. Pindzola, “Electron–impact ionization of multiply charged manganese ions”, *Phys. Rev. A* **63**, 012712 (2001).
- [20] D.C. Griffin, D.M. Mitnik, and M.S. Pindzola, “Effects of  $LS$  term dependence in He–like ions”, *Phys. Rev. A* **63**, 014702 (2001).
- [21] K. Aichele, D. Hathiramani, F. Scheuermann, A. Müller, E. Salzborn, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Deep–core dielectronic–capture resonances in the electron–impact ionization of heavy atomic ions”, *Phys. Rev. Letters* **86**, 620–623 (2001).
- [22] J. Colgan, M.S. Pindzola, D.M. Mitnik, and D.C. Griffin, “Total integral and ejected–energy differential cross sections for the electron–impact ionization of lithium”, *Phys. Rev. A* **63**, 062709 (2001).
- [23] D.C. Griffin, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Electron–impact excitation of lithium”, *Phys. Rev. A* **64**, 032718 (2001).
- [24] K. Aichele, W. Arnold, D. Hathiramani, F. Scheuermann, E. Salzborn, D.M. Mitnik, D.C. Griffin, J. Colgan, and M.S. Pindzola, “Experimental and theoretical study of electron–impact ionization of atomic ions in the Sm–isomeric sequence”, *Phys. Rev. A* **64**, 052706 (2001).
- [25] J. Colgan, and M.S. Pindzola, D.M. Mitnik, D.C. Griffin, and I. Bray, “Benchmark non–perturbative calculations for the electron–impact ionization of  $\text{Li}(2s)$  and  $\text{Li}(2p)$ ”, *Phys. Rev. Lett.* **87**, 213201 (2001).
- [26] D.C. Griffin, D.M. Mitnik, and N.R. Badnell, “Electron–impact excitation of  $\text{Ne}^+$ ”, *J. Phys. B* **34**, 4401–4416 (2001).
- [27] D.M. Mitnik, D.C. Griffin, and N.R. Badnell, “Electron–impact excitation of  $\text{Ne}^{5+}$ ”, *J. Phys. B* **34**, 4455–4474 (2001).
- [28] D.M. Mitnik, D.C. Griffin, J. Colgan, M.S. Pindzola, K. Aichele, W. Arnold, D. Hathiramani, F. Scheuermann, and E. Salzborn, “Electron–impact ionization of  $\text{Sm}^{12}$  ions: Resonances far beyond threshold”, *Phys. Rev. A*, **64**, 062705 (2001).
- [29] N.R. Badnell, D.C. Griffin, and D.M. Mitnik, “Electron–impact excitation of  $\text{Fe}^{21+}$ , including  $n=4$  levels”, *J. Phys. B* **34**, 5071–5085 (2001).
- [30] D.M. Mitnik, D.C. Griffin, and M.S. Pindzola, “Time–dependent close–coupling calculations of dielectronic capture in He”, *Phys. Rev. Letters* **88**, 173004 (2002).
- [31] S. Böhm, S. Schippers, W. Shi, A. Müller, N. Eklöv, R. Schuch, H. Danared, N.R. Badnell, D. Mitnik, and D.C. Griffin, “Measurement of the field induced dielectronic–recombination–rate enhancement of  $\text{O}^{5+}$  ions differential in the Rydberg quantum number  $n$ ”, *Phys. Rev. A* **65**, 052728 (2002).
- [32] S.D. Loch, D.C. Griffin, D.M. Mitnik, M.G. O’Mullane, M.S. Pindzola, H.P. Summers, and A.D. Whiteford, “Electron–impact ionization of all ionization stages of Krypton”, *Phys. Rev. A* **66**, 052708 (2002).
- [33] C.P. Ballance, N.R. Badnell, D.C. Griffin, S.D. Loch, D.M. Mitnik, and M.S. Pindzola, “The effects of coupling to the target continuum on the electron–impact excitation of  $\text{Li}^+$ ”, *J. Phys. B* **36**, 235–246 (2003).

- [34] D.M. Mitnik, D.C. Griffin, C.P. Ballance and N.R. Badnell, “An R–matrix with pseudo–states calculation of electron–impact excitation in  $C^{2+}$ ”, *J. Phys. B* **36**, 717–730 (2003).
- [35] N.R. Badnell, D.C. Griffin, and D.M. Mitnik, “Electron–impact excitation of  $B^+$  using the R–matrix with pseudo–states method”, *J. Phys. B* **36**, 1337–1350 (2003).
- [36] M. Schnell, M.E. Bannister, S. Böhm, G. Gwinner, S. Kieslich, A. Müller, S. Schnippers, D. Schwalm, W. Shi, A. Wolf, S.G. Zhou, S.D. Loch, N.R. Badnell, J. Colgan, D. Mitnik, and M.S. Pindzola, “Observation of trielectronic recombination in Be–like Cl ions”, *Phys. Rev. Lett.* **91**, 043001 (2003).
- [37] N.R. Badnell, M.G. O’Mullane, H.P. Summers, Z. Altun, M.A. Bautista, J. Colgan, T.W. Gorczyca, D.M. Mitnik, M.S. Pindzola, and O. Zatsarinny, “Dielectronic recombination data for dynamic finite–density plasmas. I. Goals and methodology”, *Astron. and Astroph.* **406**, 1151–1165 (2003).
- [38] D.M. Mitnik and N.R. Badnell, “Dielectronic recombination data for dynamic finite–density plasmas. VIII. The nitrogen isoelectronic sequence”, *Astron. and Astroph.* **425**, 1153–1159 (2004).
- [39] D.M. Mitnik, “Helium atom in a box: I. Doubly-excited levels within the S–wave model”, *Phys. Rev. A* **70**, 022703 (2004).
- [40] N.R. Badnell, D.M. Mitnik, M.S. Pindzola, S.D. Loch, and Sh. A. Abdel–Naby, “Dielectronic recombination of  $Pb^{79+}$  via high angular momenta”, *Phys. Rev. A* **70**, 054701 (2004).
- [41] D.M. Mitnik and J.E. Miraglia, “Simple correlated wave functions for the K–shell electrons of neutral atoms”, *J. Phys. B* **38**, 3325–3338 (2005).
- [42] S.D. Loch, J. Colgan, M.C. Witthoef, M.S. Pindzola, C.P. Ballance, D.M. Mitnik, D.C. Griffin, M.G. O’Mullane, N.R. Badnell and H.P. Summers, “Generalised collisional–radiative model for light elements. A: Data for the Li isonuclear sequence”, *Atomic Data and Nuclear Data Tables*, **92**, 813–851 (2006).
- [43] D.M. Mitnik, “Helium atom in a box: a fully quantal solution”, *Nucl. Phys. A* **790**, 784c–787c (2007).
- [44] M.S. Pindzola, F. Robicheaux, S.D. Loch, J.C. Berengut, T. Topcu, J. Colgan, M. Foster, D.C. Griffin, C.P. Ballance, D.R. Schultz, T. Minami, N.R. Badnell, M.C. Witthoef, D.R. Plante, D.M. Mitnik, “The time–dependent close–coupling method for atomic and molecular collision processes”, *J. Phys. B* **40**, R39–R60 (2007).
- [45] M.N. Faraggi, M.S. Gravielle, and D.M. Mitnik, “Interaction of ultrashort laser pulses with metal surfaces: Impulsive jellium–Volkov approximation versus the solution of the time–dependent Schrödinger equation”, *Phys. Rev. A* **76**, 012903 (2007).  
Escogido para publicación en *Virtual Journal of Ultrafast Science* **6** Issue 8, Aug (2007)
- [46] A.L. Frapiccini, G. Gasaneo, F. D. Colavecchia, and D. Mitnik, “Sturmian functions in a  $L^2$  basis: critical nuclear charge for  $N$ –electron atoms”. *J. El. Spectr. and Rel. Phen.* **161**, 199–203 (2007).
- [47] K.V. Rodriguez, G. Gasaneo, D.M. Mitnik and J.E. Miraglia, “Hylleraas–like functions with correct cusp conditions: K–shell electrons for neutral atoms”. *J. El. Spectr. and Rel. Phen.* **161**, 204–206 (2007).
- [48] K.V. Rodriguez, D.M. Mitnik, and G. Gasaneo, “Accurate and simple wavefunctions for the helium isoelectronic sequence with correct cusp conditions”, *J. Phys. B* **40**, 3923–3939 (2007).
- [49] D.C. Griffin, C.P. Ballance, D.M. Mitnik and J.C. Berengut, “Dirac R–matrix calculations of electron–impact excitation of neon–like krypton”, *J. Phys. B* **41**, 215201 (2008).

- [50] D.M. Mitnik, J. Randazzo, and G. Gasaneo, “Endohedrally confined helium: Study of mirror collapses” *Phys. Rev. A* **78**, 062501 (2008).
- [51] C.C. Montanari, C.D. Archubi, D.M. Mitnik and J.E. Miraglia, “Energy loss of protons in Au, Pb and Bi using relativistic wave functions”. *Phys. Rev. A* **79**, 032903 (2009).
- [52] C.C. Montanari, D.M. Mitnik, C.D. Archubi, and J.E. Miraglia, “Energy loss of protons in wolframium: mean excitation energy, relativistic binding energies and wave functions”. *Phys. Rev. A* **80**, 012901 (2009).
- [53] K.V. Rodriguez, V.Y. Gonzalez, G. Gasaneo, L.U. Ancarani, and D.M. Mitnik, “Accurate ground state wavefunctions for several three-body systems”. *Hyperf. Interact.* **193**, 147 (2009).
- [54] K.V. Rodriguez, L.U. Ancarani, G. Gasaneo, and D.M. Mitnik, “Ground state for two-electron and electron-muon three-body atomic systems”. *Int. Jour. of Quant. Chem.* **110**, 1820–1832 (2010).
- [55] G. Gasaneo, D.M. Mitnik, J.M. Randazzo, A.L. Frapiccini, and F.D. Colavecchia, “Theory of Hyperspherical Sturmians for three-body reactions”. *J Phys. Chem. A* **113**, 14573–14582 (2010).
- [56] A. Garriz, A. Sztrajman, and D. Mitnik, “Running into trouble with the time-dependent propagation of a wavepacket”, *Eur. J. Phys.* **31**, 785–799 (2010).
- [57] F.D. Colavecchia, G. Gasaneo, and D. Mitnik, “Double photoionization of endohedrally confined atoms”, *Journal of Atomic, Molecular, and Optical Physics* **2011**, 817034 (2011).
- [58] D. M. Mitnik, F. D. Colavecchia, G. Gasaneo, J. M. Randazzo, “Computational methods for Generalized Sturmians basis”, *Comp. Phys. Comm.* **182**, 1145–1155 (2011).
- [59] C.C. Montanari, D.M. Mitnik, and J.E. Miraglia, “A collective model for inner-shell ionization of very heavy targets”, *Radiation Effects and Defects in Solids*, **166**, 338–345 (2011).
- [60] G. Gasaneo, L.U. Ancarani, and D.M. Mitnik, “On the applicability of the Exterior Complex Scaling method for scattering problems including Coulombic potentials”, *Eur. Phys. J. D*, **66**, 60–73 (2012).
- [61] C. Ríos, M.S. Gravielle, D.M. Mitnik, and V.M. Silkin, “Band structure effects in photoelectron emission spectra from metal surfaces”, *Phys. Rev. A* **85**, 043422 (2012).
- [62] L. U. Ancarani, G. Gasaneo, D. M. Mitnik, “An analytically solvable three-body break-up model problem in hyperspherical coordinates”, Accepted for publication in *Eur. Phys. J. D* (2012).
- [63] G. Gasaneo, L.U. Ancarani, and D.M. Mitnik, “Using generalized hyperspherical Sturmian basis for three-body scattering problems”, Submitted to *J. Phys. B* (2012).
- [64] J.C. Aguiar, H.O. Di Rocco, and D. Mitnik, “Experimental Compton profiles of Be, Al and Ti and comparisons with density functional theory calculations”, Submitted to *J. of Phys. and Chem. of Solids* (2012).

**C2. Capítulo de Libros:**

- [65] J. Oreg, A. Bar-Shalom, W. Goldstein, P. Mandelbaum, D. Mitnik, E. Meroz, J.L. Schwob, and M. Klapisch, “Systematic investigation of electron impact excitation–autoionization from the ground state of highly charged GaI-like ions through  $\Delta n=1$  transitions”, in *Proceedings of the 4<sup>th</sup> International Workshop on Radiative Properties of Hot Dense Matter*, Sarasota (Florida) 1990, edited by W. Goldstein (World Scientific, London 1991), p. 273-278.
- [66] D. Mitnik, P. Mandelbaum, J.L. Schwob, J. Oreg, A. Bar-Shalom, and W.H. Goldstein, “Effect of excitation–autoionization on fractional abundances of highly ionized KrI- to NiI-like heavy elements in coronal plasmas”, in *UV and X-Ray Spectroscopy of Astrophysical and Laboratory Plasmas*, edited by E. H. Silver and S. M. Kahn (Cambridge University Press, Cambridge, England, 1993), p. 146–149.
- [67] P. Mandelbaum, R. Doron, D. Mitnik, and J.L. Schwob, “Average radiative branching ratio of autoionizing inner-shell excited configurations in highly ionized heavy atoms”, in *Proceeding of the 5<sup>th</sup> International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas (1995)*, edited by W.U.L. Tchang-Brillet, J.F. Wyart, and C.J. Zeippen, (Publications de l’Observatoire de Paris, Meudon, France, 1996), p. 116–117.
- [68] D. Mitnik, P. Mandelbaum and J.L. Schwob, “Calculations of excitation–autoionization cross sections and rate coefficients in molybdenum Cu- and Zn-like ions”, in *Proceeding of the 5<sup>th</sup> International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas (1995)*, edited by W.U.L. Tchang-Brillet, J.F. Wyart, and C.J. Zeippen, (Publications de l’Observatoire de Paris, Meudon, France, 1996), p. 118–119.
- [69] M. Cohen, P. Mandelbaum, D. Mitnik, and J.L. Schwob, “Extended calculations of excitation–autoionization processes in Ge-like molybdenum”, in *Proceeding of the 5<sup>th</sup> International Colloquium on Atomic Spectra and Oscillator Strengths for Astrophysical and Laboratory Plasmas (1995)*, edited by W.U.L. Tchang-Brillet, J.F. Wyart, and C.J. Zeippen, (Publications de l’Observatoire de Paris, Meudon, France, 1996), p. 120–121.
- [70] J. Shaw, D. Mitnik, M. Pindzola, D. Griffin, N. Badnell, “Electron-impact excitation calculations for astrophysical plasmas”, in *Stellar Evolution, Stellar Explosions and Galactic Chemical Evolution*, edited by A. Mezzacappa (IOP Publishing, Bristol and Philadelphia, 1997), p. 85–87.
- [71] T.W. Gorczyca, N.R. Badnell, D.C. Griffin, D.M. Mitnik, and M.S. Pindzola, “The R-matrix with pseudostate method”, in *Atomic Data Needs for X-Ray Astronomy*, edited by M.A. Bautista, T.R. Kallman and A.K. Pradhan, (NASA Press, Greenbelt, Maryland, USA, 2000), p. 97–102.
- [72] N.R. Badnell, M.A. Bautista, K.A. Berrington, V.M. Burke, K. Butler, M.E. Galavis, M. Graziani, D.C. Griffin, D.J. Lennon, C. Mendoza, D.M. Mitnik, J.C. Pelan, A.K. Pradhan, H.E. Saraph, P.J. Storey, J.A. Tully, C.J. Zeippen, and H.L. Zhang, “Iron Project: atomic data for IR lines”, *Planetary Nebulae in our Galaxy and Beyond*, (Proceedings IAU Symposium No. 234, Vol 2, Hawaii, Cambridge University Press, 2007), p. 211–218.

**C3. Presentaciones en Conferencias Internacionales**

- [73] D. Mitnik, P. Mandelbaum, J.L. Schwob, J. Oreg, A. Bar-Shalom, and W. Goldstein, "Excitation-autoionization processes in CuI, ZnI, GaI and KrI isoelectronic sequences". Poster paper presented at The 26<sup>th</sup> European Group for Atomic Spectroscopy Conference, Bellaterra, Spain (July 1994).
- [74] D. Mitnik, P. Mandelbaum, J.L. Schwob, "Calculations of total excitation–autoionization cross sections and rate coefficients in Ni, Cu and Zn isoelectronic sequences". Poster paper presented at The 10<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, San Francisco, USA (January 1996).
- [75] D.M. Mitnik, F. Robicheaux, M.S. Pindzola, D.C. Griffin, and N.R. Badnell, "Theory of dielectronic and radiative recombination for complex atomic ions". Invited talk presented at the *Ion-Electron Collisions in Storage Rings - Achievements and Perspectives* Workshop, Heidelberg, Germany (December 1997).
- [76] K.B. Fournier, D. Stutman, V. Soukhanovskii, M. Finkenthal, M.J. May, H.W. Moos, W.H. Goldstein and D. Mitnik, "Estimates of Population Inversion for Deep UV Transitions in Kr I-like Y, Zr, Nb and Mo Excited in a High Current Reflex Discharge". Poster paper presented at VUV XII Conference, San Francisco, CA, (August 1998).
- [77] D. Stutman, K.B. Fournier, V. Soukhanovskii, M. Finkenthal, M. May, H.W. Moos, D.M. Mitnik, and W.H. Goldstein, "Evidence of population inversion for deep UV transitions of Kr-like Y excited in a high current reflex discharge". Poster paper presented at The 11<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Auburn, USA (March 1998).
- [78] D.C. Griffin, M.S. Pindzola, J.A. Shaw, D.M. Mitnik, and N.R. Badnell, "Electron–impact excitation rates and collisional-radiative modeling of Si<sup>4+</sup>". Poster paper presented at The 11<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Auburn, USA (March 1998).
- [79] D.M. Mitnik, F. Robicheaux, M.S. Pindzola, D.C. Griffin, and N.R. Badnell, "Calculations on electron–ion recombination: New Challenges". Poster paper presented at The 11<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Auburn, USA (March 1998).
- [80] J. Klein, R. Middleton, D. Berkovits, D. Mitnik, and M. Paul, "Study of the photodisintegration of the <sup>9</sup>Be<sup>12</sup>C<sub>6</sub><sup>2-</sup> Dianion". Poster paper presented at the International Symposium on Structure and Dynamics of Negative Atomic and Molecular Ions, Aarhus, Denmark, (May 1998).
- [81] D.M. Mitnik, M.S. Pindzola, D.C. Griffin, and N.R. Badnell, "Electron–impact single ionization of atomic ions". Poster paper presented at The American Physical Society Centennial Meeting, Atlanta, USA (March 1999).
- [82] M.S. Pindzola, D.M. Mitnik, and F. Robicheaux, "Electron–impact double ionization of atoms". Paper presented at The American Physical Society Centennial Meeting, Atlanta, USA (March 1999).
- [83] D.M. Mitnik, M.S. Pindzola, and D.C. Griffin, "Collisional-Radiative modeling of the Mg<sup>10</sup> atomic ion". Poster paper presented at The 12<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Reno, Nevada, USA (March 2000).
- [84] N.R. Badnell, D.M. Mitnik, M.S. Pindzola, T.W. Gorczyca, M. O Mullane, H.P. Summers, M.A. Bautista and D.A. Verner, "Dielectronic recombination data for dynamic finite–density plasmas". Poster paper presented at The 12<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Reno, Nevada, USA (March 2000).



- [85] J. Colgan, D.M. Mitnik, and M.S. Pindzola, “Time-dependent close-coupling calculations for the electron-impact ionization of Neon”. Poster paper presented at the 2000 Annual Meeting of DAMOP, Connecticut, USA (May 2000).
- [86] D.M. Mitnik, “Progress in the parallelization of the  $R$ -matrix codes”. Invited talk presented at the *Winter Workshop on Computational Atomic Physics*, Rollins College, Florida, USA (January 2001).
- [87] D.M. Mitnik, D.C. Griffin, J. Colgan, M.S. Pindzola, K. Aichele, W. Arnold, D. Hathiramani, A. Müller, F. Scheuermann, and E. Salzborn, “New Features in Electron-Impact Ionization: Resonances far beyond threshold”. Paper presented at the 2001 Annual Meeting of DAMOP, Ontario, Canada (May 2001).
- [88] D.C. Griffin, N.R. Badnell and D.M. Mitnik, “Electron-impact excitation of Ne II”. Poster paper presented at the 2001 Annual Meeting of DAMOP, Ontario, Canada (May 2001).
- [89] J. Colgan, M.S. Pindzola, D.M. Mitnik, and D.C. Griffin, “Fully quantal ( $e, 2e$ ) calculations for hydrogen and alkali metals”. Paper presented at the 2001 Annual Meeting of DAMOP, Ontario, Canada (May 2001).
- [90] K. Aichele, W. Arnold, D. Hathiramani, F. Scheuermann, E. Salzborn, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Single-ionization of Sm ions by electron impact”. Poster paper presented at the ICPEAC conference, Santa Fe, USA (May 2001).
- [91] K. Aichele, W. Arnold, D. Hathiramani, A. Müller, F. Scheuermann, E. Salzborn, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Resonant 3d-processes in the electron-impact ionization of Sm ions”. Poster paper presented at the ICPEAC conference, Santa Fe, USA (May 2001).
- [92] D.M. Mitnik, D.C. Griffin, and N.R. Badnell, “Electron-impact excitation of  $\text{Ne}^{5+}$  calculations using new parallel  $R$ -matrix codes”. Poster paper presented at the ICPEAC conference, Santa Fe, USA (May 2001).
- [93] M.S. Pindzola, F.J. Robicheaux, J. Colgan, D.M. Mitnik, D.C. Griffin, D.R. Schultz, “Time dependent dynamics of atomic systems”. Invited talk presented at the ICPEAC conference, Santa Fe, USA (May 2001).
- [94] M.S. Pindzola, F.J. Robicheaux, J.P. Colgan, S.D. Loch, D.C. Griffin, D.M. Mitnik, C.P. Ballance, D.R. Schultz, K.R. Bartschat, N.R. Badnell, H.P. Summers, P.G. Burke, C.J. Noble, and K.A. Berrington, “Terascale computational atomic physics for controlled fusion energy”. Poster paper presented at The 13<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Gatlinburg, Tennessee, USA (April 2002).
- [95] C.P. Ballance, N.R. Badnell, K.A. Berrington, D.C. Griffin, S. Loch, and D.M. Mitnik, “ $R$ -matrix advances in large scale electron excitation calculations”. Poster paper presented at The 3<sup>rd</sup> International Conference on Atomic and Molecular Data and Their Applications, Gatlinburg, Tennessee, USA (April 2002).
- [96] D.M. Mitnik, D.C. Griffin, M.S. Pindzola, and F. Robicheaux, “Dielectronic Capture in electron scattering on a  $\text{He}^+$  ion”. Contributed talk presented at the 2002 Annual Meeting of DAMOP, Williamsburg, VA, USA (May 2002).
- [97] D.M. Mitnik, “Progress in the parallelization of the  $R$ -matrix codes”. Invited talk presented at the *Winter Workshop on Computational Atomic Physics*, Rollins College, Florida, USA (January 2003).
- [98] S.D. Loch, N.R. Badnell, Z. Altun, M. Bautista, J. Colgan, M. Fogle, T. W. Gorczyca, D.M. Mitnik, M.G. O’Mullane, M.S. Pindzola, D.W. Savin, R. Schuch, H.P. Summers and O. Zatsarinny, “Dielectronic recombination calculations for dynamic finite density plasmas”. Poster paper presented at The 14<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Santa Fe, New Mexico, USA (April 2004).

- [99] S.D. Loch, N.R. Badnell, C.P. Ballance, M. Bautista, J. Colgan, D.C. Griffin, D.M. Mitnik, M.G. O’Mullane, M.S. Pindzola, H.P. Summers, A.D. Whiteford and M. Witthoef, “Ionization cross section calculations of both light and heavy species for ITER relevant studies”. Poster paper presented at The 14<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas, Santa Fe, New Mexico, USA (April 2004).
- [100] K.V. Rodriguez, D. Mitnik, and G. Gasaneo, “Two–electron systems as a function of the nuclear charge”. Poster paper presented at the XIX APS International Conference on Atomic Physics, Rio de Janeiro, Brasil (July 2004).
- [101] Darío Mitnik, “Helium atom in a box: Doubly excited levels”. Poster paper presented at the ICPEAC conference, Rosario, Argentina (July 2005).
- [102] D.M. Mitnik and J.E. Miraglia, “Simple correlated wave functions for the K–shell electrons of neutral atoms”. Poster paper presented at the ICPEAC conference, Rosario, Argentina (July 2005).
- [103] D.M. Mitnik and J.E. Miraglia, “Cusp conditions and convergences in Close–Coupling wavefunctions, for inner–shell electrons”. Poster paper presented at the Thirteenth International Symposium on Polarization and Correlation in electronic and Atomic Collisions”, Buenos Aires, Argentina (July 2005).
- [104] K.V. Rodriguez, D.M. Mitnik, and G. Gasaneo, “Hylleraas–like functions with correct cusp conditions: the He isoelectronic sequence”. Poster paper presented at the 18th International IUPAP Conference on Few–Body Problems in Physics, Sao Paulo, Brasil, (August 2006).
- [105] A.L. Frapiccini, G. Gasaneo, F.D. Colavecchia, and D. Mitnik, “Positive energy Sturmians in a  $L^2$  basis for scattering problems”. Poster paper presented at the 18th International IUPAP Conference on Few–Body Problems in Physics, Sao Paulo, Brasil, (August 2006).
- [106] A.L. Frapiccini, G. Gasaneo, F. D. Colavecchia, and D. Mitnik, “Sturmian functions in a  $L^2$  basis: critical nuclear charge for n–electron atoms”. Poster paper presented at the International Conference on Many particle spectroscopy of atoms, molecules, clusters and surfaces, Roma, Italy (June 2006).
- [107] K.V. Rodriguez, G. Gasaneo, D.M. Mitnik and J.E. Miraglia, “Hylleraas-like functions with correct cusp conditions: K–shell electrons for neutral atoms”. Poster paper presented at the International Conference on Many particle spectroscopy of atoms, molecules, clusters and surfaces, Roma, Italy (June 2006).
- [108] D. M. Mitnik, “Helium atom in a box: a fully quantal solution”. Contributed talk presented at the 18<sup>th</sup> International IUPAP Conference on Few–Body Problems in Physics, Santos, Brazil (August 2006).
- [109] D.M. Mitnik, I. Aldazabal, A. Arnau, M.S. Gravielle, J.E. Miraglia, and V.H. Ponce, “Time dependent simulations of electron emission in grazing ion surface collisions”. Poster paper presented at the 16<sup>th</sup> International Workshop on Inelastic Ion–Surface Collisions (IISC-16), Schloss Hernstein, Austria (September 2006).
- [110] M. Faraggi, M.S. Gravielle, and D.M. Mitnik, “Interacción de pulso laser sobre superficie metálica: aproximación Impulsiva Jellium–Volkov vs. solución exacta”. Poster paper presented at the III Encuentro Sudamericano de Colisiones Inelásticas en la Materia, Buenos Aires, Argentina (October 2006).
- [111] D.M. Mitnik, I. Aldazabal, A. Arnau, and V.H. Ponce, “Simulaciones dinámicas de colisiones rasantes Ion–Superficie”. Contributed talk presented at the III Encuentro Sudamericano de Colisiones Inelásticas en la Materia, Buenos Aires, Argentina (October 2006).

- [112] K.V. Rodriguez, G. Gasaneo, S. Otranto and D.M. Mitnik, “Photo–Ionization processes of two–electron atoms near the critical nuclear charge”. Poster paper presented at the XXV International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Freiburg, Germany (July 2007).
- [113] M.N. Faraggi, M.S. Gravielle and D.M. Mitnik, “Photoelectron emission from metal surfaces: description based on the jellium model”. Poster paper presented at the XXV International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Freiburg, Germany (July 2007).
- [114] D.M. Mitnik and G. Gasaneo, “Electron structure of endohedrally confined He atoms”. Poster paper presented at the XXV International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Freiburg, Germany (July 2007).
- [115] K.V. Rodriguez, G. Gasaneo and D.M. Mitnik, “Simple and accurate variational wavefunctions for two–electron ions”, Poster paper presented at the XXV International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Freiburg, Germany (July 2007).
- [116] D.M. Mitnik, A. Arnau, I. Aldazábal and V.H. Ponce, “Time–dependent simulations: Acceleration and deceleration of convoy electrons in grazing–ion–surface collisions”. Poster paper presented at the XX International Symposium on Ion–Atom collisions (ISIAC) conference, Crete, Greece (August 2007).
- [117] D.M. Mitnik, A. Arnau, I. Aldazábal and V.H. Ponce, “Time–dependent simulations of electron emission in grazing–ion–surface collisions”. Invited talk presented at the XX ISIAC conference, Crete, Greece (August 2007).
- [118] D.M. Mitnik, J.M. Randazzo, A.L. Frapiccini, F.D. Colavecchia, and G. Gasaneo, “Time–dependent method with Sturmian basis functions”. Poster paper presented at the Workshop on Atomic Ions Stage Abundances in Astrophysical Plasmas, Auburn, USA (February 2008).
- [119] K.V. Rodriguez, V.Y. Gonzalez, L.U. Ancarani, D.M. Mitnik, and G. Gasaneo, “Helium  $n^{1,3}S$  excited states obtained with an angular correlated configuration interaction method”. Poster paper presented at the 40<sup>th</sup> European Group for Atomic Systems (EGAS) conference, Graz, Austria (July 2008).
- [120] K.V. Rodriguez, V.Y. Gonzalez, L.U. Ancarani, D.M. Mitnik, and G. Gasaneo, “Ground states wavefunctions for two–electron systems with finite nuclear mass”. Poster paper presented at the 40<sup>th</sup> European Group for Atomic Systems (EGAS) conference, Graz, Austria (July 2008).
- [121] D.M. Mitnik, J.M. Randazzo and G. Gasaneo, “Mirror collapses in endohedrally confined atoms: entropies, nodal surfaces and transition probabilities”. Poster paper presented at the Many particle spectroscopy of atoms, molecules, clusters and surfaces (MPS08) conference, Paris, France (June 2008).
- [122] K.V. Rodriguez, V.Y. Gonzalez, L.U. Ancarani, D.M. Mitnik, and G. Gasaneo, “Angular correlated configuration–interaction (ACCI) method for Helium  $S$  excited states”. Poster paper presented at the Many particle spectroscopy of atoms, molecules, clusters and surfaces (MPS08) conference, Paris, France (June 2008).
- [123] K.V. Rodriguez, V.Y. Gonzalez, L.U. Ancarani, D.M. Mitnik, and G. Gasaneo, “Ground states for two–electron systems with finite nuclear mass”. Poster paper presented at the Many particle spectroscopy of atoms, molecules, clusters and surfaces (MPS08) conference, Paris, France (June 2008).
- [124] C.C. Montanari, C.D. Archubi, D.M. Mitnik and J.E. Miraglia, “Energy loss and straggling of protons in Tungsten”. Invited talk presented at the 23<sup>rd</sup> International Conference of Atomic Collisions in Solids (ICACS) conference, Limpopo, South Africa (August 2008).

- [125] C.C. Montanari, C.D. Archubi, D.M. Mitnik and J.E. Miraglia, “Total stopping power and its straggling for protons in heavy targets, fully relativistic calculations for Au, Pb and Bi”. Poster paper presented at the 23<sup>rd</sup> International Conference of Atomic Collisions in Solids (ICACS) conference, Limpopo, South Africa (August 2008).
- [126] Y.V. Gonzalez, K.V. Rodriguez, G. Gasaneo, L.U. Ancarani, and D.M. Mitnik, “Accurate ground state wavefunctions for several three-body systems”. Poster paper presented at the International Conference on exotic atoms and related topics, Viena, Austria (September 2008).
- [127] C.C. Montanari, C.D. Archubi, D.M. Mitnik and J.E. Miraglia, “Pérdida de energía y straggling de protones en W, Au, Pb y Bi”. Invited talk presented at the IV Encontro Sul-Americano de colisões inelásticas na materia, Río de Janeiro, Brasil (Octubre 2008).
- [128] F.D. Colavecchia, J.M. Randazzo, G. Gasaneo, and D.M. Mitnik, “Secciones eficaces triplemente diferenciales para la doble fotoionización de átomos confinados en fullerenos”. Poster paper presented at the IV Encontro Sul-Americano de colisões inelásticas na materia, Río de Janeiro, Brasil (Octubre 2008).
- [129] D.M. Mitnik and M.S. Gravielle, “Ultrashort laser pulses in metal surfaces: origin of spurious oscillations in fully quantal calculations”. Poster paper presented at the XXVI International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Kalamazoo, USA (July 2009).
- [130] G. Gasaneo, D.M. Mitnik, L.U. Ancarani, F.D. Colavecchia, A.L. Frapiccini, and J.M. Randazzo, “Testing the hyperspherical Sturmian approach for break up processes: an analytically solvable model”. Poster paper presented at the 10<sup>th</sup> European Conference on Atoms, Molecules and Photons, Salamanca, Spain (July 2010).
- [131] C.C. Montanari, D.M. Mitnik, C.D. Archubi and J.E. Miraglia, “Stopping and straggling of ions in solids within the shellwise local plasma approximation”, Oral talk presented at the 21st International Conference in the Application of Accelerators in Research and Industry, Fort Worth, USA, (Aug. 2010).
- [132] J.M. Randazzo, A.L. Frapiccini, G. Gasaneo, D. Mitnik, L.U. Ancarani, and F.D. Colavecchia, “Electron impact ionization in the Temkin–Poet model with Sturmian functions”. Poster paper presented at the 63<sup>rd</sup> Annual Gaseous Electronics Conference, Paris, France (October 2010).
- [133] G. Gasaneo, D.M. Mitnik, L.U. Ancarani, F.D. Colavecchia, A.L. Frapiccini, and J.M. Randazzo, “An analytically solvable model to test the hyperspherical Sturmian approach for break up processes”. Oral talk presented at the 63<sup>rd</sup> Annual Gaseous Electronics Conference, Paris, France (October 2010).
- [134] C.C. Montanari, D.M. Mitnik, and J.E. Miraglia, “Energy loss and mean excitation energy of ions in solids within the shellwise local plasma approximation”, Invited talk presented at the Third International Meeting on Recent Developments in the Study of Radiation Effects in Matter, Gramado, Brazil (Oct. 2010)
- [135] A.L. Frapiccini, J.M. Randazzo, G. Gasaneo, F.D. Colavecchia, D.M. Mitnik, and L.U. Ancarani, “Ab-Initio Sturmian method for three-body quantum mechanical problems: Scattering states and ionizing collisions”. Poster paper presented at the V Encuentro Sudamericano de Colisiones Inelásticas en la Materia, Valparaíso, Chile (December 2010).
- [136] D.M. Mitnik, J.M. Randazzo, G. Gasaneo and F.D. Colavecchia, “Endohedrally confined atoms in Fullerenes: He (and the time capsule)”. Oral talk presented at the V Encuentro Sudamericano de Colisiones Inelásticas en la Materia, Valparaíso, Chile (December 2010).

- [137] J.M. Randazzo, A.L. Frapiccini, G. Gasaneo, F.D. Colavecchia, D.M. Mitnik, and L.U. Ancarani, “Ab–Initio Sturmian method for three–body quantum mechanical problems: Atomic and molecular bound states”. Oral talk presented at the V Encuentro Sudamericano de Colisiones Inelásticas en la Materia, Valparaíso, Chile (December 2010).
- [138] C.C. Montanari, D.M. Mitnik and J.E. Miraglia, “Inner–shell ionization of very heavy targets”. Poster paper presented at the 20<sup>th</sup> International Conference on Ion Beam Analysis, Itapema, Brazil (April 2011).
- [139] C.C. Montanari, D.M. Mitnik and J.E. Miraglia, “The shellwise local plasma approximation, a collective model to describe bound electrons”. Poster paper presented at the 20<sup>th</sup> International Conference on Ion Beam Analysis, Itapema, Brazil (April 2011).
- [140] K.V. Rodriguez, L.U. Ancarani, D.M. Mitnik, and G. Gasaneo, “Correlated  $n^{1,3}S$  states for three–body systems in screened potentials”, Poster paper presented at the 43<sup>rd</sup> Congress of the European Group on Atomic Systems, Fribourg, Switzerland (July 2011).
- [141] L.U. Ancarani, G. Gasaneo, and D. Mitnik, “A break–up model solved in hyperspherical coordinates”, Invited talk presented at the 22<sup>nd</sup> International Symposium on Ions Atom Collisions (ISIAC), Caen, France (July 2011).
- [142] C.C. Montanari, D.M. Mitnik and J.E. Miraglia, “A collective model for inner shell ionization”. Poster paper presented at the 22<sup>nd</sup> International Symposium on Ions Atom Collisions (ISIAC), Caen, France (July 2011).
- [143] L.U. Ancarani, G. Gasaneo, and D.M. Mitnik, “Can the exterior complex scaling method be applied to pure Coulomb potentials?”, Invited talk presented at the International Symposium on  $(e, 2e)$ , Double Photoionization and Related Topics, and 16<sup>th</sup> International Symposium on Polarization and Correlation in Electronic and Atomic Collisions, Dublin, Ireland (Aug. 2011).
- [144] C.C. Montanari, D.M. Mitnik and J.E. Miraglia, “L and M–shell ionization of very heavy targets”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).
- [145] J.M. Randazzo, D.M. Mitnik, L.U. Ancarani, G. Gasaneo, F.D. Colavecchia, and A.L. Frapiccini, “Hyperspherical versus spherical treatment of asymptotic conditions for three–body scattering problems”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).
- [146] J.M. Randazzo, D.M. Mitnik, L.U. Ancarani, G. Gasaneo, F.D. Colavecchia, and A.L. Frapiccini, “Wave packet propagation with a generalized Sturmian basis”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).
- [147] K.V. Rodriguez, L.U. Ancarani, A.L. Frapiccini, D.M. Mitnik, and G. Gasaneo, “Ground state for two–electron atoms in exponential–cosine–screened Coulomb potentials”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).
- [148] G. Gasaneo, L.U. Ancarani, A.L. Frapiccini, and D.M. Mitnik, “On the applicability of the Exterior Complex Scaling method for scattering problems including Coulombic potentials”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).
- [149] C.A. Rios, M.S. Gravielle, D.M. Mitnik, and V.M. Silkin, “Band–structure based model for photoelectron emission from metal surfaces”. Poster paper presented at the XXVII International Conference on Photonic, Electronic and Atomic Collisions (ICPEAC) conference, Belfast, North Irland (July 2011).

- [150] G. Gasaneo, J.M. Randazzo, D.M. Mitnik, L.U. Ancarani, and F.D. Colavecchia, “Hyperspherical Sturmian approach for break up processes”, Poster paper presented at the International Symposium on  $(e, 2e)$ , Double Photoionization and Related Topics, and 16<sup>th</sup> International Symposium on Polarization and Correlation in Electronic and Atomic Collisions, Dublin, Ireland (Aug. 2011).
- [151] G. Gasaneo, F.D. Colavecchia, and D.M. Mitnik “A Sturmian approach to deal with three-body ionization processes”, Invited talk presented at the International Symposium on  $(e, 2e)$ , Double Photoionization and Related Topics, and 16<sup>th</sup> International Symposium on Polarization and Correlation in Electronic and Atomic Collisions, Dublin, Ireland (Aug. 2011).
- [152] D.M. Mitnik, J.M. Randazzo, G. Gasaneo, F.D. Colavecchia, “Endohedrally confined Helium atoms: mirror collapse, effects on structure and double photoionization”, Invited talk presented at the International Symposium on  $(e, 2e)$ , Double Photoionization and Related Topics, and 16<sup>th</sup> International Symposium on Polarization and Correlation in Electronic and Atomic Collisions, Dublin, Ireland (Aug. 2011).
- [153] L.U. Ancarani, G. Gasaneo, and D. Mitnik, “A break-up model solved in hyperspherical coordinates”, Invited talk presented at the 64<sup>th</sup> Annual Gaseous Electronics Conference, Austin, Texas, USA (November 2011).
- [154] L.U. Ancarani, G. Gasaneo, and D. Mitnik, “On the applicability of the Exterior Complex Scaling method for scattering problems including Coulombic potentials”, Invited talk presented at the 64<sup>th</sup> Annual Gaseous Electronics Conference, Austin, Texas, USA (November 2011).
- [155] I.A. Gomez, G. Gasaneo, D.G. Arbo, D.M. Mitnik and B. Piraux, “Positive energy Generalized Sturmian functions applied to atomic photoionization”, Poster paper presented at the Molecular Electronic Structure at Troy, Canakkale, Turkey (Sept 2012).

#### C4. Presentaciones en Conferencias Nacionales (Israel, Alemania y Argentina)

- [156] D.M. Mitnik, P. Mandelbaum, and J.L. Schwob, “Calculations of electron-impact excitation-autoionization processes for the GaI isoelectronic sequences”. Poster paper presented at the 39<sup>th</sup> meeting of the Israel Physical Society, Tel Aviv University, Tel Aviv, Israel (May 1993).
- [157] D.M. Mitnik, P. Mandelbaum, and J.L. Schwob, “Calculations of excitation-autoionization cross sections and rate coefficients in CuI, ZnI, GaI and KrI isoelectronic sequences and the effect on fractional-ion-abundance balance in coronal plasmas”. Poster paper presented at the 41<sup>st</sup> meeting of the Israel Physical Society, Bar-Ilan University, Tel Aviv, Israel (April 1995).
- [158] D.M. Mitnik, P. Mandelbaum, and J.L. Schwob, “Calculations of total excitation-autoionization cross sections and rate coefficients in Ni, Cu and Zn isoelectronic sequences”. Poster paper presented at the 42<sup>nd</sup> meeting of the Israel Physical Society, The Hebrew University, Jerusalem, Israel (March 1996).
- [159] K.Aichele, F. Scheuermann, W Arnold, D. Hathiramani, A. Müller, E. Salzborn, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Deep-core dielectronic capture resonances in the electron-impact ionization of Sm ions”. Poster paper presented at the Deutsche Physikalische Gesellschaft (DPG) E-Verhandlungen 2001, Berlin, Germany (April 2001).
- [160] K.Aichele, D. Hathiramani, W Arnold, E. Salzborn, D.M. Mitnik, J. Colgan, and M.S. Pindzola, “Dielektronische 3d-Anregungspazess bei der elektronenstoßionisation von Praseodym- und Samarium-Ionen”. Poster paper presented at the Arbeitskreis Energiereiche Atomarc Stoße, Dresden, Germany (January 2001).

- [161] J.M. Randazzo, G. Gasaneo, D.M. Mitnik, P. Beelli, and N.J. Castellani, “Scattering de un electron por estructuras cristalinas de fullerenos  $C_{60}$  y  $C_{20}$  en un modelo de potenciales de rango cero”. Poster paper presented at the 92<sup>a</sup> Reunión Nacional de Física, Salta, Argentina (September 2007).
- [162] A. Sztrajman and D.M. Mitnik, “Métodos numéricos en física atómica: estudio de condiciones de borde transparentes”. Poster paper presented at the 92<sup>a</sup> Reunión Nacional de Física, Salta, Argentina (September 2007).
- [163] A. Garriz and D.M. Mitnik, “Evolución temporal de emisión electrónica en colisiones rasantes ión–superficie”. Poster paper presented at the 93<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: A–96.
- [164] M. Faraggi, I. Aldazabal, M.S. Gravielle, D.M. Mitnik, A. Arnau, V.M. Silkin, “Emisión foto–electrónica desde superficies metálicas por pulsos láser intensos y ultra–cortos”. Poster paper presented at the 93<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: A–99.
- [165] A. Sztrajman and D.M. Mitnik, “Contribución resonante a la excitación de iones por impacto electrónico”. Poster paper presented at the 93<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: A–118.
- [166] C.C. Montanari, C.D. Archubi, D.M. Mitnik and J.E. Miraglia, “Pérdida de energía de protones en Au, Pb y Bi”, Poster paper presented at the 93<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: A–120.
- [167] A. Garriz, A. Sztrajman and D.M. Mitnik, “Problemas en la propagación temporal de la ecuación de Schrödinger”. Poster paper presented at the 93<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: B–33.
- [168] I.A. Gomez, G. Gasaneo, K.V. Rodriguez, M.J. Ambrosio, and D.M. Mitnik, “Resolviendo el problema de tres cuerpos en forma eficiente”. Poster paper presented at the 98<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: 569.
- [169] C. Ruibiano Rios, M.S. Gravielle, D.M. Mitnik, and V. Silkin “Efecto de la estructura de bandas en el espectro de la emisión foto–electrónica desde superficies metálicas”. Poster paper presented at the 98<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: 48.
- [170] G. Michalski, D. Mitnik, and F. Berbeglia “Espectro numérico del pozo infinito”. Divisional talk presented at the 98<sup>a</sup> Reunión Nacional de Física, Buenos Aires, Argentina (September 2008). Proceedings: 48.

## C5. Coloquios

- [171] D.M. Mitnik, “Atomic Physics with Supercomputers”, University of Kentucky, Louisville (USA) (April 2001).
- [172] D.M. Mitnik “Física Atómica con Supercomputadoras”, Universidad de Buenos Aires, Buenos Aires, Argentina (Noviembre 2002).
- [173] D.M. Mitnik “Massive calculations for simple atomic physics problems”, Donostia International Physics Center (DIPC) y Universidad del País Vasco (UPV/EHU), San Sebastián, España (Octubre 2004).
- [174] “Supercálculos para miniproblemas”, 4<sup>tas</sup> Jornadas Abiertas de Física, 50 Aniversario de la Universidad Nacional del Sur, Bahía Blanca, Argentina (Noviembre 2005).
- [175] “Massive calculations in atomic physics”, NASA University Research – Center for Aerospace Device Research and Education, and NSF Center of Research Excellence in Science and Technology – Computational Center for Fundamental and Applied Science and Education. North Carolina Central University, Durham, (USA) (March 2010).

- [176] “De los átomos a las estrellas”, Universidad Nacional de Salta, Argentina (Noviembre 2010).



**C6. Proyectos Acreditados**

1. “*Desarrollo de métodos espectrales para la solución de la ecuación de Schrödinger dependiente del tiempo, aplicados en colisiones atómicas*”.  
Proyecto PIP552, CONICET, 2010-2012. Dirección.
2. “*Correlación dinámica en procesos con emisión de dos y tres electrones*”.  
Proyecto PICT 2008/0934, Agencia Nacional para la Promoción de la Ciencia y la Tecnología, 2010-2012. Co-dirección.
3. “*Desarrollo de métodos espectrales para la solución de la ecuación de Schrödinger dependiente del tiempo, aplicados en colisiones atómicas*”.  
Convenio de Cooperación Internacional, Proyecto Conjunto (Fonds de la Recherche Scientifique) FNRS y CONICET, 2011–2013. Dirección.
4. “*Métodos numéricos avanzados aplicados a procesos atómicos inelásticos*”.  
Proyecto UBACyT20020090100239, Universidad de Buenos Aires, 2010–2012. Dirección.
5. “*Métodos computacionales avanzados en física atómica*”.  
Proyecto UBACyT X471, Universidad de Buenos Aires, 2008–2010. Dirección.
6. “*Interacciones con Sólidos y Superficies*”.  
Proyecto PIP6268, CONICET, 2005–2007. Co-Dirección.
7. “*Aplicación de métodos computacionales avanzados en física atómica*”.  
Proyecto UBACyT X075, Universidad de Buenos Aires, 2004–2007. Dirección.
8. “*Colisiones de Iones con Sólidos y Superficies*”.  
Proyecto UBACyT X259, Universidad de Buenos Aires, 2004–2007. Integrante.
9. “*Interacción de partículas atómicas con sólidos y superficies*”.  
PICT R 2002 00122, Agencia Nacional para la Promoción de la Ciencia y la Tecnología, 2004–2007. Integrante.
10. “*Distribución de energía en transiciones atómicas inelásticas*”.  
Proyecto UBACyT X044, Universidad de Buenos Aires, 2003–2007. Integrante.
11. “*Computational Atomic Physics for Controlled Fusion*”  
US DoE Grant DE-FG02-01ER54G44 with Auburn University, Office of Fusion Energy, Department of Energy, USA, 1999–2002. Integrante.
12. “*Computational Atomic Collision Physics Using Massively Parallel Computers*”  
National Energy Research Scientific Computing Center, Department of Energy, USA, 1998–2000. Codirección.
13. “*Theoretical Atomic Collision Physics for Controlled Fusion Energy*”  
US DoE Grant DE-FC02-91-ER75678 with Alabama EPSCoR, Office of Fusion Energy, Department of Energy, USA, 1998–2000. Integrante.
14. “*Theoretical Atomic Physics for Controlled Fusion*”  
US DoE Grant DE-FG05-96-ER54348 with Auburn University, Office of Fusion Energy, Department of Energy, USA, 1997–1998. Integrante.

**D. FORMACION DE RECURSOS HUMANOS****1. Dirección de Tesis de Doctorado**

Ilán A. Gómez, *“Estudio de estructura y de procesos de fragmentación en sistemas de tres cuerpos mediante métodos ab-initio, utilizando bases en coordenadas hipersféricas”*.

Co-dirección junto con el Prof. G. Gasaneo, Universidad Nacional del Sur, Bahía Blanca, Argentina.

Período: 2012–2015.

**2. Dirección de Tesis de Doctorado**

Julio C. Aguiar, *“Estudio del Perfil Compton mediante teoría del Densidad Funcional”*.

Co-dirección junto con el Prof. H.O. Di Rocco, Universidad Nacional del Centro de la Provincia de Buenos Aires, Tandil, Argentina.

Período: 2011–2013.

**3. Dirección de Tesis de Licenciatura**

Alejandro Sztrajman, *“Implementación de métodos numéricos avanzados en Física Atómica”*.  
Universidad de Buenos Aires.

Graduación: Abril 2011.

Calificación: Sobresaliente.

**4. Dirección de Tesis de Doctorado**

Karina V. Rodriguez, *“Estudio de la estabilidad de sistemas de partículas cargadas”*.

Co-dirección junto con el Prof. G. Gasaneo, Universidad Nacional del Sur, Bahía Blanca, Argentina.

Graduación: 23 Junio 2010.

Calificación: Sobresaliente.

**5. Dirección de Beca Postdoctoral**

Dr. Subhendu Paul (University of Calcutta, India), *“Métodos no perturbativos en coordenadas hipersféricas”*

Co-dirección junto con el Prof. G. Gasaneo, Universidad Nacional del Sur, Bahía Blanca, Argentina.

Período indicado: 2010–2012. (no iniciada por problemas de visado).

**6. Dirección de Tesis de Doctorado**

Abel Garriz, *“Evolución temporal de emisión electrónica en colisiones rasantes ión-superficie”*.  
Co-dirección junto con el Dr. F.D. Colavecchia, Centro Atómico Bariloche, Río Negro, Argentina.

Período 2008–2008.

**7. Dirección de Beca Estímulo**

Alejandro Sztrajman, *“Implementación de métodos numéricos avanzados en Física Atómica”*.  
Universidad de Buenos Aires.

2009-2010.

**8. Colaboraciones en Tesis de Master**

Durante mi permanencia en el Laboratorio de Plasma Spectroscopy en la Hebrew University of Jerusalem, se han graduado como M. Sc. Ehud Behar y Rami Doron, habiendo colaborado activamente (si bien extraoficialmente) tanto en su instrucción como en el desarrollo de cálculos y en la actividad experimental.

## E. CURSOS DICTADOS Y ACTIVIDADES DE DIFUSIÓN

### 1. Cursos

- (a) “*Minicurso de Computación en Paralelo*”  
IAFE, (Mayo 2005).
- (b) “*Introducción a la Espectroscopía de Plasmas*”  
Curso con participación de alumnos del Profesorado de la Universidad San Martín, Observatorio Nacional de Física Cósmica, San Miguel (a realizarse en Agosto 2006).

### 2. Dirección de Pasantes

- (a) “*La Física Cuántica con  $t$  en lugar de  $x$* ”  
Pasantes: Mayra Rostagno y Bruno Alvisio, IAFE (2007).
- (b) “*La Física Cuántica para atrás: Cómo sabe Schrödinger que existe Heisenberg?*”  
Pasantes: Lucila Zarate y Emiliano Cabrera IAFE (2006).

### 3. Actividades de Difusión

- (a) “*Física Cuántica: Paradojas, Juegos y Magia*”  
Taller de Relatividad, Cosmología y Física Cuántica, Instituto de Astrofísica y Física del Espacio, (Noviembre 2008, Noviembre 2009, Octubre 2010 y Octubre 2011).
- (b) “*¿De qué están hechas las Estrellas?*”  
Charlas de Divulgación, Instituto de Astrofísica y Física del Espacio, (Mayo 2008).
- (c) “*Introducción a la Física Cuántica*”  
Taller de Relatividad, Cosmología y Física Cuántica,  
  
Instituto de Astronomía y Física del Espacio (Octubre 2007).
- (d) “*La Física Atómica y las Estrellas*”  
Semana de la Astronomía en el Centro Cultural,  
Universidad Nacional General Sarmiento (Octubre 2007) <sup>||</sup>.
- (e) “*Introducción a la Física Cuántica*”  
Taller de Relatividad, Cosmología y Física Cuántica, Instituto de Astrofísica y Física del Espacio, (Septiembre 2006).
- (f) “*¿Qué hace un grupo de Colisiones en un Instituto de Astronomía?*”  
Charlas de Café, Instituto de Astrofísica y Física del Espacio, (Marzo 2006).
- (g) “*Einstein, la cuántica y los dados*”  
Ciclo de charlas de divulgación en conmemoración de los 100 años de la Universidad de La Plata, UNLP (Mayo 2005).
- (h) “*Curso de Introducción a la Física Cuántica*”  
IAFE (Abril–Mayo 2005).
- (i) “*Qué nos dice la luz de las estrellas: Introducción a la Espectroscopía de Plasmas*”  
Proyecto EnDiAS para la Enseñanza y Divulgación de la Astronomía, Observatorio Nacional de Física Cósmica, San Miguel (2004).
- (j) “*A propósito de Copenhagen*”  
Charla de divulgación, IAFE (2004).
- (k) “*La Física Cuántica, muerde?*”  
Ciclo Talleres de Ciencia para Jóvenes, IAFE (2004).
- (l) “*Introducción a la Física Cuántica*”  
Charla de divulgación, IAFE (2004).

<sup>||</sup>[http://www.ungs.edu.ar/ungs/noticias/nov\\_new98.htm](http://www.ungs.edu.ar/ungs/noticias/nov_new98.htm)

#### 4. Organización de Congresos y Conferencias

- (a) *The Thirteenth International Symposium on Polarization and Correlation in electronic and Atomic Collisions*, Buenos Aires, Argentina (Julio 2005). Organizador Local.
- (b) *International Symposium on (e, 2e), Double Photoionization and Related Topics*, Buenos Aires, Argentina (Julio 2005). Organizador Local.
- (c) *ICPEAC (Julio 2005)*.  
Comité de Organización Local.
- (d) *The 11<sup>th</sup> APS Topical Conference on Atomic Processes in Plasmas*, Auburn, USA (March 1998). Organizador Local.

#### 5. Actividades Sinérgicas

- (a) Referato de Artículos en Revistas Internacionales: *Journal of Physics B*, *Physical Review A*, *Physical Review Letters*, *Int. Jour. of Phys. Sc.*
- (b) Referato de Artículos en Conferencias Internacionales: ICPEAC, e2e, BAAA, etc.
- (c) Evaluador de Proyectos de Investigación (ANPCyT).
- (d) Jurado de Tesis de Doctorado, Dr. J.M. Randazzo, Instituto Balseiro, Universidad Nacional de Cuyo (2009).

## 6. Material Didáctico Sistematizado

- (a) *Introducción a los Métodos Numéricos en Física*  
Material didáctico para la elaboración de las clases teóricas y prácticas del curso. Contiene clases teóricas, problemas, programas, materiales de lectura complementaria y otros.  
Universidad Nacional del Sur, Departamento de Física,  
URL: <http://www.iafe.uba.ar/e2e/metodosnumericos/index.html>
- (b) *Problemas de Física 4*  
Material didáctico para la elaboración de las clases prácticas del curso. Contiene problemas, preguntas de repaso, materiales de lectura complementaria y otros.  
Universidad de Buenos Aires, Departamento de Física,  
URL: <http://www.df.uba.ar/users/dmitnik/fisica4/index.html>
- (c) *Problemas de Física Teórica 2*  
Material didáctico para la elaboración de las clases prácticas del curso. Contiene problemas, preguntas de repaso, materiales de lectura complementaria y otros.  
Universidad de Buenos Aires, Departamento de Física,  
URL: <http://www.df.uba.ar/users/dmitnik/teoricaII/index.html>
- (d) *Introducción a Unix*  
Material didáctico auxiliar para la parte computacional de las clases prácticas de los cursos dictados. Contiene un breve manual, problemas, materiales de lectura complementaria y otros.  
Universidad de Buenos Aires, Departamento de Física,  
URL: <http://www.df.uba.ar/users/dmitnik/computacion/unix/intro.html>
- (e) *Introducción a Fortran*  
Material didáctico auxiliar para la parte computacional de las clases prácticas de los cursos dictados. Contiene un breve manual, problemas, materiales de lectura complementaria y otros.  
Universidad de Buenos Aires, Departamento de Física,  
URL: <http://www.df.uba.ar/users/dmitnik/computacion/fortran/intro.html>
- (f) *Introducción a Mathematica*  
Material didáctico auxiliar para la parte computacional de las clases prácticas de los cursos dictados. Contiene un breve manual, problemas, materiales de lectura complementaria y otros.  
Universidad de Buenos Aires, Departamento de Física,  
URL: <http://www.df.uba.ar/users/dmitnik/computacion/mathtour/mathtour.html>

## 7. Desarrollo de Software

- (a) *Software para Conferencia Internacional*  
Página web utilizada en las conferencias *The Thirteenth International Symposium on Polarization and Correlation in electronic and Atomic Collisions* y *International Symposium on (e, 2e), Double Photoionization and Related Topics*, organizadas en Buenos Aires, (Julio 2005). El software incluye la inscripción, pagos, recepción de resúmenes, envío de confirmaciones, confecciones de listas para administración interna, y preparación de libros, en forma automática.  
URL: <http://www.iafe.uba.ar/e2e/e2econfer/>
- (b) *Software para Votación Electrónica*  
Software implementado en diversas votaciones internas del IAFE. El programa incluye la “identificación anónima”, chequeo de datos en el padrón, votación electrónica y escrutinio de votos.  
URL: <http://www.iafe.uba.ar/e2e/votacion/index.html>

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