Curriculum Vitae

Arjan Berger

Contact Details

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Personal Details

Gender:	Male
Date and Place of Birth:	24 February 1978, Steenwijk, The Netherlands
Languages:	Dutch (mother-tongue) English, French and Italian (fluent) German (advanced)

Present Position

Maître de conférences (Since September 2011)

Laboratoire de Chimie et Physique Quantiques
IRSAMC, Université Paul Sabatier
31000 Toulouse
France

Education

2002–2006

Ph.D. Faculty of Mathematics and Natural Sciences, University of Groningen, Groningen, The Netherlands
Title of thesis: Current-density functionals in extended systems
Defense date: 2 October 2006
Promotor: prof. dr. R. Broer
Co-promotores: dr. R. van Leeuwen, dr. ir. P.L. de Boeij
Project funded by the Foundation for Fundamental Research on Matter (FOM).

1997–2002

Master of Science in Chemistry (cum laude), University of Groningen, Groningen, The Netherlands
Title of Master thesis: Time-dependent current-density-functional theory for optical spectra; A study of the electric exchange-correlation field.
Supervisors: prof. dr. J. G. Snijders and dr. ir. P. L. de Boeij

Postdoc

2006–2007

Theoretical Chemistry Group, University of Groningen, Groningen, The Netherlands.

2007-2011

Laboratoire des Solides Irradiés, École Polytechnique, Palaiseau, France.

Grants

2009

Chaire X-ESPCI-SAINT GOBAIN: 94056 Euro

2011-2016

Chaire d'excellence CNRS

2015

IDEX-Emergence: 114000 Euro

Conferences Organized

2013

CECAM workshop: Green's function methods: the next generation
Toulouse, France
http://www.cecam.org/workshop-892.html

2014

Theory days on self-interaction correction
Toulouse, France
http://www.lpt.ups-tlse.fr/spip.php?article1103

2015

CECAM workshop: Green's function methods: the next generation II
Lausanne, Switzerland
http://www.cecam.org/workshop-1155.html

2016

Workshop on multiple solutions in many-body theories.
Paris, France

2016

CMD26 Colloquium: Theoretical spectroscopy: extending the *ab-initio* landscape
Groningen, Netherlands
http://cmd26.eu/

University teaching

2002–2005

Chemical bonding - exercise class

2011-2012

Atomistique et liaison chimique (L2) - course + exercice class
Outils des Mathématiques (L1) - exercice class

2012-2014

Atomistique et liaison chimique (L2) - course + exercice class
Outils des Mathématiques (L1) - exercice class

Optique Ondulatoire (L2) - exercice class
Thermodynamique (L2) - exercice class

2014-2016

Atomistique et liaison chimique (L2) - course + exercice class
Optique Ondulatoire (L2) - exercice class
Thermodynamique (L1 + L2) - course + exercice class

2015-2016

Méthodes perturbatives avancées pour la physique (Cours doctoraux) - course

Teaching at schools

1. Quantum Dynamics
   TCCM winter school LTTC, Saint-Lary-Soulan, France (2016).
   http://www.irsamc.ups-tlse.fr/lttc/
2. Quantum Dynamics
   TCCM winter school LTTC, Bagnères-de-Luchon, France (2015).
   http://www.irsamc.ups-tlse.fr/lttc/
3. Configuration-interaction methods for large systems
   TCCM winter school, Saint-Lary-Soulan, France (2014).
   http://www.irsamc.ups-tlse.fr/qclams/

List of research-related activities

- Referee of Physical Review Letters and Physical Review B.
- Developer of the ADF code (www.scm.org)
- Developer of the ABINIT code (www.abinit.org).
- Research Team Leader of the European Theoretical Spectroscopy Facilities (ETSF)

Invited Talks

1. Theoretical spectroscopy for molecules and solids from the current density.
   Marseille condensed matter 2016: optics and magnetism, Marseille, France (2016).
2. Theoretical spectroscopy for molecules and solids from the induced current density.
   MAGIC-2016, Salerno, Italy (2016).
3. Advances in time-dependent current-density-functional theory.
   16th International conference computational and mathematical methods in science and engineering, Rota, Spain (2016).
4. Electric and Magnetic Response in BAND.
   ADF developer workshop, Amsterdam, The Netherlands (2014).
5. Polarization and Magnetization for Periodic Solids from Time-Dependent Current-DFT.
   13th International conference computational and mathematical methods in science and engineering, Almeria, Spain (2013).
6. Time-dependent current-density-functional theory for extended systems.
   Theory days on current-density functional theory, Toulouse, France (2012).
7. The effective-energy technique: *GW* calculations without summing over empty states.
   Challenges and solutions in *GW* calculations for complex systems, Lausanne, Switzerland (2011).
8. The effective-energy technique: *GW* calculations without summing over empty states.
   5th international Abinit developer workshop, Han-sur-Lesse, Belgium (2011).

9. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
   15th International workshop on computational physics and materials science: total energy and force methods, Trieste, Italy (2011).
10. The absorption of SnO_2 in the visible range.
    Moving theory to applications, Palaiseau, France (2010).
11. Theory and applications of time-dependent current-density-functional theory.
    7th ETSF young researchers meeting, Jyväskylä, Finland (2010).

Contributed Talks

1. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
   CMD26, Groningen, Netherlands (2016).
2. Unphysical and physical solutions in many-body theories: from weak to strong correlation.
   Journées de la matière condensée 15 (JMC15), Bordeaux, France (2016).
3. Advances in time-dependent current-density-functional theory.
   Réunion GDR-REST, Roscoff, France (2016).
4. Advances in time-dependent current-density-functional theory.
   APS March meeting, Baltimore, United States (2016).
5. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
   Réunion GDR-REST, Toulouse, France (2015).
6. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
   Réunion GDR-CORREL, Marseille, France (2015).
7. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
   DPG Frühjarstagung, Berlin, Germany (2015).
8. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
   APS March meeting, San Antonio, USA (2015).
9. The exact solution of the many-body problem in one point: insights in approximate Green's function approaches.
   APS March meeting, Denver, USA (2014).
10. The magnetization of periodic solids from time-dependent current-DFT.
    APS March meeting, Baltimore, USA (2013).
11. The magnetization of periodic solids from time-dependent current-DFT.
    DPG Frühjarstagung, Regensburg, Germany (2013).
12. Efficient *GW* calculations for SnO2, ZnO and rubrene: the effective-energy technique.
    International Symposium and Workshop on Electron Correlations and Materials Properties of Compounds and Alloys, Porto Heli, Greece (2012).
13. Efficient *GW* calculations for SnO2, ZnO and rubrene: the effective-energy technique.
    International conference of advanced materials modeling, Nantes, France (2012).
14. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
    DPG Tagungen, Dresden, Germany (2011).
15. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
    ETSF workshop on electronic excitations, Berlin, Germany (2010).
16. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
    Psi-k 2010, Berlin, Germany (2010).

17. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
International conference of advanced materials modeling, Nantes, France (2010).
18. *GW* without empty states.
March meeting of the American Physical Society, Portland, United States (2010).
19. *GW* without empty states.
13th ETSF workshop on electronic excitations, Evora, Portugal (2009).
20. Real-time propagation in the time-dependent optimized-potential method.
4th Nanoquanta young researchers meeting, San Sebastian, Spain (2007).
21. Time-dependent current-density-functional theory in extended systems.
Spectroscopy and theoretical chemistry meeting, NWO workshop, Lunteren, The Netherlands (2006).
22. Ultranonlocal exchange-correlation effects in the response of extended systems.
The scientific FOM-days on condensed matter, Veldhoven, The Netherlands (2003).

List of Publications

1. Gauge-invariant formulation of circular dichroism.
N. Raimbault, P. L. de Boeij, P. Romaniello, and J. A. Berger
J. Chem. Theory Comp. **12**, 3278 (2016).

2. Unphysical and physical solutions in many-body theories: from weak to strong correlation.
A. Stan, P. Romaniello, S. Rigamonti, L. Reining, and J. A. Berger
New J. Phys. **17**, 093045 (2015).

3. Fully parameter-free calculation of optical spectra for insulators, semiconductors and metals from a simple polarization functional.
J. A. Berger
Phys. Rev. Lett. **115**, 137402 (2015).

4. Reduced density-matrix functional theory: Correlation and spectroscopy.
S. Di Sabatino, J. A. Berger, L. Reining, and P. Romaniello
J. Chem. Phys. **143**, 024108 (2015).

5. Gauge-invariant calculation of static and dynamical magnetic properties from the current density.
N. Raimbault, P. L. de Boeij, P. Romaniello, and J. A. Berger
Phys. Rev. Lett. **114**, 066404 (2015).

6. Exact solution to the many-body problem in one point.
J. A. Berger, P. Romaniello, F. Tandetzky, B. S. Mendoza, Ch. Brouder, and, L. Reining
New J. Phys. **16**, 113025 (2014).

7. A rational reduction of CI expansions: combining localized molecular orbitals and selected charge excitations.
T. Krah, N. Ben Amor, D. Maynau, J. A. Berger, and V. Robert
J. Mol. Mod. **20**, 2240 (2014).

8. Efficient calculation of the polarizability: a simplified effective-energy technique.
J. A. Berger, L. Reining, and F. Sottile
Eur. Phys. J. B **85**, 236 (2012).

9. Efficient *GW* calculations for SnO_2, ZnO, and rubrene: the effective-energy technique.
   J. A. Berger, L. Reining, and F. Sottile
   Phys. Rev. B **85**, 085126 (2012).

10. *Ab initio* calculations of electronic excitations: Collapsing spectral sums.
    J. A. Berger, L. Reining, and F. Sottile
    Phys. Rev. B **82**, 041103(R) (2010).

11. Double excitations in finite systems.
    P. Romaniello, D. Sangalli, J. A. Berger, F. Sottile, L. Molinari, L. Reining, G. Onida, J.
    J. Chem. Phys. **130**, 044108 (2009).

12. Analysis of the Vignale-Kohn current functional in the calculation of optical spectra.
    J. A. Berger, P. L. de Boeij, and R. van Leeuwen.
    Phys. Rev. B **75**, 035116 (2007).

13. Performance of the Vignale-Kohn functional in the linear response of metals.
    J. A. Berger, P. Romaniello, R. van Leeuwen, and P. L. de Boeij.
    Phys. Rev. B **74**, 245117 (2006).

14. A physical model for the longitudinal polarizabilities of polymer chains.
    J. A. Berger, P. L. de Boeij, and R. van Leeuwen.
    J. Chem. Phys. **123**, 174910 (2005).

15. Analysis of the viscoelastic coefficients in the Vignale-Kohn functional: The cases of one- and three-dimensional polyacetylene.
    J. A. Berger, P. L. de Boeij, and R. van Leeuwen.
    Phys. Rev. B **71**, 155104 (2005).

16. Size-scaling of the polarizability of tubular fullerenes investigated with time-dependent (current)-density-functional theory.
    M. van Faassen, L. Jensen, J. A. Berger, and P. L. de Boeij.
    Chem. Phys. Lett. **395**, 274 (2004).

17. Application of time-dependent current-density-functional theory to nonlocal exchange-correlation effects in polymers.
    M. van Faassen, P. L. de Boeij, R. van Leeuwen, J. A. Berger, and J. G. Snijders.
    J. Chem. Phys. **118**, 1044 (2003).

18. Ultranonlocality in time-dependent current-density-functional theory: Applications to conjugated polymers.
    M. van Faassen, P. L. de Boeij, R. van Leeuwen, J. A. Berger, and J. G. Snijders.
    Phys. Rev. Lett. **88**, 186401 (2002).

19. Current-density-functional theory for optical spectra: A successful polarization functional.
    P. L. de Boeij, F. Kootstra, J. A. Berger, R. van Leeuwen, and J. G. Snijders.
    J. Chem. Phys. **115**, 1995 (2001).