

## Curriculum Vitae

Jean-Sébastien Caux

J.S.Caux@uva.nl  
<https://staff.fnwi.uva.nl/j.s.caux>  
ORCID iD: 0000-0001-9322-5011

Nationality: Canadian  
Date of birth: 6 November 1971  
Status: married, 2 children

Instituut voor Theoretische Fysica,  
Universiteit van Amsterdam  
Science Park 904  
1098 XH Amsterdam  
The Netherlands  
tel.: +020 525 5775  
fax: +020 525 5778

### CURRENT EMPLOYMENT

**Instituut voor Theoretische Fysica,  
Universiteit van Amsterdam**  
Hoogleraar (Full Professor)  
*Theory of Low-Dimensional Quantum Codensed Matter*  
since April 2012.

### RESEARCH INTERESTS

My research interests are centered on the physics of strongly interacting many-body quantum systems including cold atomic gases, quantum spin systems, quantum dots and wires. The overall goal is to develop new nonperturbative theoretical methods for the calculation of experimentally relevant quantities, in particular the Quench Action formalism.

My main recent contributions have been the development of the ABACUS approach for dynamical correlation functions of integrable models, which has been applied to spin chains and atomic gases, and to have developed integrability-based tools relevant to the field of out-of-equilibrium quantum systems.

### Keywords

- **Condensed matter theory:** strongly-correlated systems, low-dimensional physics, disordered systems, spin chains, carbon nanotubes, atomic gases and condensates, quantum dots and wires.
- **Mathematical physics:** integrable models, conformal field theory, bosonization, (nonlinear) Luttinger liquids, supersymmetry.
- **Computational methods:** Python (+ Django), C++ and D programming, parallelization (MPI, OpenMP).

**PREVIOUS EMPLOYMENT**

- 04/07 - 03/12            **Instituut voor Theoretische Fysica,  
Universiteit van Amsterdam**  
Universitair HoofdDocent (UHD) (Associate Professor)
- 01/03 - 04/07            **Instituut voor Theoretische Fysica,  
Universiteit van Amsterdam**  
FOM Springplanker (research associate)
- 10/99 - 12/02            **All Souls College, University of Oxford**  
Postdoctoral Research Fellow
- 9/98 - 08/99            **UBC, Vancouver**  
Postdoc

**UNIVERSITY EDUCATION**

- 10/94 - 10/6/98        **University of Oxford**  
D.Phil. Theoretical Condensed Matter Physics  
St John's College  
Supervisor: Prof. A. M. Tsvelik  
Title of Thesis: "Multifractality for Disordered Fermions: from a  
Logarithmic Conformal Field Theory to an Exact Solution"  
(defended 10/06/1998; degree ceremony 24/11/2001)
- 9/91 - 21/6/94        **Université de Montréal**  
B. Sc. Physics

**PRE-DOCTORAL RESEARCH EXPERIENCE**

- 6/93 - 9/93 & 6/94 - 9/94      Research assistant to Prof. Luc Vinet,  
Mathematical Physics,  
Centre de Recherches Mathématiques, U. de Montréal
- 6/92 - 9/92            Research assistant to Prof. François Wesemael,  
White Dwarf Astrophysics,  
Département de Physique, U. de Montréal

**MAIN PERSONAL RESEARCH FELLOWSHIPS OBTAINED**

- 01/03 - 12/07        FOM Springplanker
- 06/04 - 09/04        CNRS: Chercheur Associé (Lyon)
- 10/99 - 12/02        Five-year Postdoctoral Research Fellowship  
All Souls College, Oxford
- 9/98 - 8/99            NSERC Canada Postdoctoral Fellowship

**AWARDS AND SCHOLARSHIPS**

- 10/94 - 9/98 NSERC Canada 1967 Scholarship
- 10/94 - 9/97 Rhodes Scholarship
- 1993 Award of the Dean, Faculty of Arts & Sciences, U. de Montréal
- 1992 & 1993 Rose Daoust-Duquette Award, U. de Montréal
- 1991 - 1994 Canada Scholarship, U. de Montréal

**MAIN PERSONAL RESEARCH GRANTS OBTAINED**

- 09/14 - 08/19 **FOM Projectruimte**  
 “From Newton’s cradle to Gibbs’s grave”  
 (390k€ for postdoc & student salaries)
- 09/11 - 08/16 **NWO VICI grant**  
 “Bethe liquids: a new way of tackling strong correlations in and out of equilibrium”  
 (1514k€ for PI, postdoc & student salaries)
- 09/11 - 08/16 **FOM Grant**  
 “Nonlinear Luttinger liquid response functions”  
 (part of new FOM program “The singular physics of 1D electrons”)  
 (234k€ for student salary, part of 2335k€ total for program)
- 09/09 - 08/13 **FOM Projectruimte**  
 “A new launch pad for renormalization”  
 (355k€ for postdoc & student salaries)
- 09/08 - 08/12 **FOM Projectruimte**  
 “Cracking the quantum quench”  
 (335k€ for postdoc & student salaries)
- 09/05 - 08/08 **FOM Grant (within existing CCSPP Program)**  
 “The challenges of the chiral metal”  
 (180k€ for postdoc salaries)

**PARTICIPATION IN OTHER COLLABORATIVE GRANTS**

- 2011-2015 Partner investigator in the International Research Staff Exchange Scheme  
 “Quantum Integrability, Conformal Field Theory and Topological Quantum Computation” (QICFT)  
 (Coordinator: Prof. G. Mussardo (SISSA))
- 2011-2013 Partner Investigator on Australian Research Council (ARC)  
 Discovery Projects Grant “Quantum equilibration”  
 (Chief investigator: Dr K. Kheruntsyan, U. of Queensland)
- 2005-2010 Participating researcher in the European Science Foundation

Research Networking Programme “INSTANS” (Interdisciplinary  
Statistical and Field Theory Approaches to Nanophysics  
and Low Dimensional Systems)  
(Coordinator: Prof. G. Mussardo (SISSA))

## MAIN COLLABORATIONS

### Theorists:

I. Affleck (UBC, Vancouver)	J. Brand (Auckland)
J. van den Brink (Dresden)	P. Calabrese (Pisa)
C. Castelnovo (Cambridge)	J. T. Chalker (Oxford)
A. Yu. Cherny (Dubna)	M. Davis (Queensland)
F. H. L. Essler (Oxford)	H. G. Evertz (Graz)
A. Faribault (Nancy)	L. Glazman (Yale)
V. Gritsev (Amsterdam)	R. Konik (Brookhaven)
H. Konno (Hiroshima)	C. Korff (Glasgow)
A. Läuchli (Innsbruck)	J. M. Maillet (Lyon)
R. Pereira (Sao Carlos)	I. Prez Castillo (Mexico)
T. Prosen (Ljubljana)	N. Reshetikhin (Berkeley/UvA)
H. Saleur (Saclay, Paris)	U. Schollwöck (Munich)
S. Simon (Oxford)	J. Sirker (Alberta)
N. Slavnov (Moscow)	S. R. White (UC Irvine)
R. Weston (Edinburgh)	

### Experimentalists:

M. C. Aronson (Texas A&M)	D. Clment (Palaiseau)
L. Fallani (Florence)	C. Fort (Florence)
M. S. Golden (Amsterdam)	R. Heimbuch (Twente)
M. Inguscio (Florence)	B. Lake (Berlin)
J. Mesot (PSI; EPFL)	H.-C. Nägerl (Innsbruck)
S. E. Nagler (Oak Ridge)	A. F. Otte (Delft)
T. Perring (Rutherford Labs; UCL)	Ch. Rüegg (UCL)
H. Rønnow (ETH Zürich)	T. Schmitt (PSI)
A. Tennant (Oak Ridge)	B. Thielemann (ETH; PSI)
I. Zaliznyak (Brookhaven)	H. Zandvliet (Twente)

## SUPERVISION

### Postdocs supervised:

1. Domenico Suppa (Oxford, 2001-2)
2. Pasquale Calabrese (Amsterdam, 2005-6)
3. Alexandre Faribault (Amsterdam, 2006-8)
4. Balazs Pozsgay (Amsterdam, 2009-11)
5. Guillaume Palacios (Amsterdam, 2009-11)
6. Giuseppe Brandino (Amsterdam, 2011-13)
7. Michael Brockmann (Amsterdam, 2012-15)
8. Davide Fioretto (Amsterdam + Fribourg, shared with V. Gritsev, 2011-14)

9. Omar El Araby (Amsterdam, 2013-15)
10. Eoin Quinn (Amsterdam, 2015-(17))

**Ph.D. theses supervised:**

1. Joseph Tomlinson, “Interactions and Disorder in Chiral Metals”, defended 30 August 2005 (co-supervision with J. T. Chalker).
2. Rob Hagemans, “Dynamics of Heisenberg spin chains”, defended 12 April 2007.
3. Antoine Klauser, “Adjacent spin operator correlations in the Heisenberg spin chain”, defended 5 April 2012.
4. Jorn Mossel, “Quantum integrable models out of equilibrium”, defended 13 September 2012.
5. Miłosz Panfil, “Density-density correlation in the 1D Bose gas”, defended 9 October 2013.
6. Jacopo De Nardis, “Correlation functions of in- and out-of-equilibrium integrable models”, defended 25 September 2015.
7. Bram Wouters, “The Quench Action Approach to Out-of-Equilibrium Quantum Integrable Models”, defended 2 October 2015.
8. Rianne van den Berg, defence expected 2016.
9. Rogier Vlijm, defence expected 2016.
10. Sebas Eliëns, defence expected end 2016.
11. Sergio Enrique Tapias Arze, defence expected 2019.

**Ph.D. theses co-supervised:**

1. Thessa Fokkema (shared with K. Schoutens), “Supersymmetric Lattice Models”, defended 4 March expected 2016.
2. Anton Quelle (shared with C. Morais Smith and C. Beenakker), defence expected 2017.
3. Moos van Caspel (shared with V. Gritsev and D. Schuricht), defence expected 2018.
4. Geoffroy Bergeron (shared with L. Vinet, Montreal), defence expected 2019.

**Master’s theses supervised:**

1. Jorn Mossel, “Dynamics of the antiferromagnetic Heisenberg spin-1/2 chain” (defended 25 August 2008), Cum Laude.
2. Panagiota Adamopoulou, “Singularities in the Structure Factor of the anisotropic Heisenberg spin-1/2 chain” (defended 30 November 2009).
3. Evert Bosdriesz, “The Central Spin Problem and the Richardson Equations” (defended 30 November 2009), Cum Laude.
4. Miłosz Panfil, “Density-density correlation of the deformed Tonks-Girardeau gas” (defended 15 December 2009 at the VU).
5. Javier Freire Sánchez “Correlation functions of spinless interacting fermions” (defended December 2010).

6. Robert Noest, “The Algebraic Bethe Ansatz” (defended August 2012).
7. Willem-Victor van Gerven Oei, “Form factor results by coordinate Bethe Ansatz for the two-component delta-potential gas in one dimension” (defended August 2012).
8. Olya Shevchuk, “Classification of states in the  $XXZ$  model” (defended August 2012).
9. Rogier Vlijm, “Numerical solutions of the Bethe equations for the isotropic spin-1 chain” (defended August 2012).
10. Benedetta Flebus, “Universal transport signatures of Majorana fermions in superconductor-Luttinger liquid junctions” (defended April 2013).
11. Giulio Bertoli, “Quantum Integrability Classes” (defended August 2015).

**Bachelor and 2dejaars projects:**

1. Lynn Hoendervanger, “Bosonen In Een Een-Dimensionale Potentiaal”, Bachelor project, 2007.
2. Hans van Deurzen, “Grafeen en tabletop Quantum Elektrodynamica”, Bachelor project, 2008.
3. Luc Blom, Evert-Jan Goeree, Paul de Lange and Lodewijk Nauta, “On the Occurrence of Solitons in the Fermi-Pasta-Ulam Chain: a Theoretical Treatise”, 2dejaars project, 2008.
4. Charlotte van Leeuwen, Chris de Weerd and Eric Dashorst, “Quantum Cryptography and Quantum Computations”, 2dejaars project, 2010.
5. Robert Noest, “Topological Classification of Insulators and Superconductors”, Bachelor project 2010.
6. Moos van Caspel, “Luttinger Liquids in Cold Atoms”, Bachelor project 2010.
7. Jan Koster, “E8 Symmetry in Condensed Matter”, Bachelor project (with B. Nienhuis), 2010.

**TEACHING**

- Nomination by NSA for Docent van het jaar (**Teacher of the year**), University of Amsterdam (all faculties combined), 2010.
- **Runner-up**, Docent van het jaar (**Teacher of the year**), University of Amsterdam (all faculties combined), 2008.
- BKO certificate (Learning and Teaching in Higher Education), University of Amsterdam, 2008.
- Organizer of the DRSTP (national Dutch Research School of Theoretical Physics) Graduate Schools in Statistical Physics and Theory of Condensed Matter, 2008, 2009 and 2010).
- Member of the Curriculumcommissie Natuur- en Sterrenkunde, University of Amsterdam, since 2010.

**University lecture courses taught (Bachelor's and Master's level)**

- “Statistical Physics and Condensed Matter Theory I”, compulsory core course for the Master's programme, Amsterdam, 2007 - 2016.
- “Statistical Physics and Condensed Matter Theory I(2)”, optional complement to core course for the Master's programme, Amsterdam, 2007-2016.
- “From Path Integrals to Field Theory”, honours course for 3rd year Bachelor's, Amsterdam, 2014 - 2016.
- “Electrodynamica en relativiteitstheorie 1”, compulsory third year course for the Bachelor's programme, Amsterdam, 2009 and 2010.
- “Straling en Atoomfysica”, undergraduate course, Amsterdam, 2004.
- “Kleine Werkgroep”, undergraduate course, Amsterdam, 2004.
- “Statistical physics of traffic flow”, first-year undergraduate project, Amsterdam, 2003.
- “Integrable models”, advanced graduate course, Oxford, 2001.
- “Introduction to Quantum Field Theory”, compulsory graduate course, Oxford 2001.
- “Field theories for disordered systems”, graduate course, Oxford, 2000.

**Other courses taught (advanced level)**

- “Integrable models in atomic and condensed matter physics”, lecture course at the 2014 Nordita School on Integrable Systems, Stockholm, August 2014.
- “Integrable models in atomic and condensed matter physics”, lecture course for the 2014 Swiss Programme Doctoral de Physique, Ecole Polytechnique Fédérale de Lausanne, April & May 2014.
- “The one-dimensional interacting Bose gas (Lieb-Liniger model)”, lecture course at the 2014 Statistical Field Theories school, Galileo Galilei Institute, Firenze, February 2014.
- “A crash course on the Bethe Ansatz (mostly spin chains)”, lecture course at the 2011 NORDITA winter school on condensed matter physics, January 2011.
- “Integrable models in atomic and condensed matter physics”, lecture course at the Beg Rohu summer school on Concepts and Methods of Statistical Mechanics, August 2010.
- “Spin chains and 1D Bose gases: from integrability to dynamics”, DRSTP postgraduate AIO/OIO School on Statistical Physics and Theory of Condensed Matter (SPTCM), 23-27 April 2007.
- “The physics of integrable models”, extended specialist lecture course, University of Utrecht, 2006.
- “The dynamics of integrable models”, set of lectures at the spring school of the EUCLID European network, Berlin, 2006.

**OTHER ACTIVITIES****Publishing:**

Founder of SciPost, a not-for-profit foundation running <https://scipost.org>, a scientific publication initiative run by and for professional scientists.

**Institutional responsibilities:**

Coordinator of the Master's in Physics and Astronomy, track Theoretical Physics (since 2015).

**International committees:**

Member of the **Science Committee** of ICAM/I2CAM (Institute for Complex Adaptive Matter, [www.i2cam.org](http://www.i2cam.org)).

**National committees:**

Member of the FOM COMOP (condensed matter and optical physics) commission (2013-01-01 to 2018-12-31; chairman from 2017-01-01).

**International-level conference organization:**

2003 Amsterdam Summer Workshop on Flux, Charge, Topology and Statistics, Instituut voor Theoretische Fysica, 30 June-5 July 2003 (co-organizers: C. J. M. Schoutens and A. M. M. Pruisken).

2005 Amsterdam Summer Workshop on Low-Dimensional Quantum Condensed Matter (LDQCM-05), Instituut voor Theoretische Fysica, 25-30 July 2005 (co-organizers: C. J. M. Schoutens and A. M. M. Pruisken).

2007 Amsterdam Summer Workshop on Low-Dimensional Quantum Condensed Matter (LDQCM-07), Instituut voor Theoretische Fysica, 2-7 July 2007 (co-organizers: C. J. M. Schoutens and A. M. M. Pruisken).

2009 Amsterdam Summer Workshop on Low-Dimensional Quantum Condensed Matter (LDQCM-09), Instituut voor Theoretische Fysica, 6-11 July 2009 (co-organizers: C. J. M. Schoutens and A. M. M. Pruisken).

2013 Amsterdam Summer Workshop on Low-Dimensional Quantum Condensed Matter (LDQCM-13), Instituut voor Theoretische Fysica, 8-12 July 2013 (co-organizers: C. J. M. Schoutens and A. M. Turner).

2015 Amsterdam Summer Workshop on Low-Dimensional Quantum Condensed Matter (LDQCM-13), Instituut voor Theoretische Fysica, 29 June-3 July 2015 (co-organizers: P. Corboz, V. Gristev and C. J. M. Schoutens).

**National conferences:**

Organizer of the Landelijk Seminarium Gecondenseerde Materie, 14 November 2003, UvA.

Organizer of the Landelijk Seminarium Gecondenseerde Materie, 13 April 2007, UvA.



Organizer of the Landelijk Seminarium Gecondenseerde Materie, 26 March 2010, UvA.

Member of the Programmacommissie for **Physics@FOM Veldhoven 2011**.

**Symposia:**

Organizer of the DRSTP-Young symposium on ‘The Future of Theoretical Physics in the Netherlands’, 26-27 October 2006 (with D. Boer (VU), J. van den Brink (UL), E. Pallante (RUG), R. van Roij (UU)).

**Outreach:**

‘ $1 + 1 \neq 2$  en andere verrassingen in gecondenseerde materie’, UvA Viva Fysica (outreach activity for prospective physics students), 1 February 2008.

‘Een student natuurkunde doet...’, NSA ouderdag (for parents of physics students), UvA, 17 January 2009.

‘Quantum cryptografie en quantum computers’, proefcollege natuurkunde (for prospective physics students), UvA, 21 January 2010.

‘Quantum cryptografie en quantum computers’, proefcollege natuurkunde (for prospective physics students), UvA, 11 April 2011.

‘Quantum cryptografie en quantum computers’, proefcollege natuurkunde (for prospective physics students), UvA, 8 December 2011.

‘Quantum cryptografie en quantum computers’, proefcollege natuurkunde (for prospective physics students), UvA, 29 January 2013.

**Refereeing:**

Referee for international journals, among which Science, Nature (Physics), Physical Review Letters, Physical Review A and B, Journal of Statistical Mechanics, Journal of Physics A, Europhysics Letters.

Referee for national funding agencies such as FOM (NL), the National Science Foundation (USA), Agence Nationale de Recherche (France), EPSRC (U.K.).

**Other administrative tasks:**

ICT contactperson for the institute, 2004-2010.

Member of the ‘Nieuwbouw commissie’ for the institute (2009-2011).

Mentor for WiF (UvA science faculty network which aims to help female scientists in their career).

**ADDITIONAL INTERESTS, HOBBIES**

Languages        French, English, Dutch, Spanish (fluent)  
                      German, Italian (intermediate)  
                      Russian (basic)

Sports            Squash, cycling, rowing, running and open water diving

Hobbies           35mm, medium- and Large-format black & white photography; Go.

**PUBLICATIONS****Published papers**

- [1] J.-S. Caux, I. I. Kogan and A. M. Tsvelik, “Logarithmic operators and hidden continuous symmetry in critical disordered models”, Nucl. Phys. **B466** 444-462 (1996);
- [2] J.-S. Caux and A. M. Tsvelik, “The Klein-Gordon limit of the sine-Gordon model in the presence of kinks”, Nucl. Phys. **B474** 715-725 (1996);
- [3] J.-S. Caux, I. I. Kogan, A. Lewis and A. M. Tsvelik, “Logarithmic operators and dynamical extension of the symmetry group in the bosonic  $SU(2)_0$  and SUSY  $SU(2)_2$  WZNW models”, Nucl. Phys. **B489** 469-484 (1997);
- [4] J.-S. Caux, N. Taniguchi and A. M. Tsvelik, “Termination of multifractal behaviour for critical disordered Dirac fermions”, Phys. Rev. Lett. **80**, 1276 (1998);
- [5] J.-S. Caux, N. Taniguchi and A. M. Tsvelik, “Disordered Dirac fermions: multifractality termination and logarithmic conformal field theories”, Nucl. Phys. **B525**, 671-696 (1998);
- [6] J.-S. Caux, “Exact multifractality for disordered N-flavour Dirac fermions in two dimensions”, Phys. Rev. Lett. **81**, 4196 (1998);
- [7] I. Affleck, J.-S. Caux and A. M. Zagoskin, “Andreev scattering and Josephson current in a one-dimensional interacting electron liquid”, Phys. Rev. B **62**, 1433-1445 (2000);
- [8] M. J. Bhaseen, J.-S. Caux, I. I. Kogan and A. M. Tsvelik, “Disordered Dirac fermions: the marriage of three different approaches”, Nucl. Phys. **B** 618, 465-499 (2001);
- [9] J.-S. Caux, H. Saleur and F. Siano, “Josephson current in Luttinger liquid-superconductor junctions”, Phys. Rev. Lett. **88**, 106402 (2002);
- [10] J.-S. Caux, A. López and D. Suppa, “Currents and correlations in Luttinger liquids and carbon nanotubes at finite temperature and size: a bosonization study”, Nucl. Phys. **B** 651, 413-457 (2003);
- [11] J.-S. Caux, F. H. L. Essler and U. Löw, “Dynamical structure factor of the anisotropic Heisenberg chain in a transverse field”, Phys. Rev. B **68**, 134431 (2003);
- [12] J.-S. Caux, H. Saleur and F. Siano, “The two-boundary sine-Gordon model”, Nucl. Phys. **B** 672, 411-461 (2003);
- [13] R. Hagemans, J.-S. Caux and Ute Löw, “Gapped anisotropic chains in a field”, Phys. Rev. B **71**, 014437 (2005);
- [14] J. W. Tomlinson, J.-S. Caux and J. T. Chalker, “Electron Interactions and Transport between Coupled Quantum Hall Edges”, Phys. Rev. Lett. **94**, 086804 (2005);
- [15] J.-S. Caux and J. M. Maillet, “Computation of Dynamical Correlation Functions of Heisenberg Chains in a Magnetic Field”, Phys. Rev. Lett. **95**, 077201 (2005);
- [16] J. W. Tomlinson, J.-S. Caux and J. T. Chalker, “Transport between edge states in multilayer integer quantum Hall systems: exact treatment of Coulomb interactions and disorder”, Phys. Rev. B **72**, 235307 (2005);
- [17] J.-S. Caux, R. Hagemans and J. M. Maillet, “Computation of dynamical correlation functions of Heisenberg chains: the gapless anisotropic regime”, *J. Stat. Mech.* (2005) P09003;

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- [18] J.-S. Caux and P. Calabrese, “Dynamical density-density correlations in the one-dimensional Bose gas”, *Phys. Rev. A* **74**, 031605(R) (2006);
- [19] R. G. Pereira, J. Sirker, J.-S. Caux, R. Hagemans, J. M. Maillet, S. R. White and I. Affleck, “The dynamical spin structure factor for the anisotropic spin-1/2 Heisenberg chain”, *Phys. Rev. Lett.* **96**, 257202 (2006);
- [20] J.-S. Caux and R. Hagemans, “The 4-spinon dynamical structure factor of the Heisenberg chain”, *J. Stat. Mech.* (2006) P12013;
- [21] J.-S. Caux, P. Calabrese and N. Slavnov, “One-particle dynamical correlations in the one-dimensional Bose gas”, *J. Stat. Mech.* (2007) P01008;
- [22] P. Calabrese and J.-S. Caux, “Correlation Functions of the One-Dimensional Attractive Bose Gas”, *Phys. Rev. Lett.* **98**, 150403 (2007);
- [23] R. G. Pereira, J. Sirker, J.-S. Caux, R. Hagemans, J. M. Maillet, S. R. White and I. Affleck, “Dynamical structure factor at small  $q$  for the XXZ spin-1/2 chain”, *J. Stat. Mech.* (2007) P08022;
- [24] R. Hagemans and J.-S. Caux, “Deformed strings in the Heisenberg model”, *J. Phys. A: Math. Theor.* **40** (2007) 14605-14647;
- [25] P. Calabrese and J.-S. Caux, “Dynamics of the attractive 1D Bose gas: analytical treatment from integrability”, *J. Stat. Mech.* (2007) P08032;
- [26] A. Faribault, P. Calabrese and J.-S. Caux, “Exact mesoscopic correlation functions of the Richardson pairing model”, *Phys. Rev. B* **77**, 064503 (2008);
- [27] J.-S. Caux, J. Mossel and I. Pérez Castillo, “The two-spinon transverse structure factor of the gapped Heisenberg antiferromagnetic chain”, *J. Stat. Mech.* (2008) P08006.
- [28] A. Faribault, P. Calabrese and J.-S. Caux, “Quantum quenches from integrability: the fermionic pairing model”, *J. Stat. Mech.* (2009) P03018.
- [29] B. Thielemann, Ch. Regg, H. M. Rønnow, A. M. Läuchli, J.-S. Caux, B. Normand, D. Biner, K. W. Krämer, H.-U. Gdel, J. Stahn, K. Habicht, K. Kiefer, M. Boehm, D. F. McMorrow, J. Mesot, “Direct Observation of Magnon Fractionalization in the Quantum Spin Ladder”, *Phys. Rev. Lett.* **102**, 107204 (2009).
- [30] A. C. Walters, T. G. Perring, J.-S. Caux, A. T. Savici, G. D. Gu, C.-C. Lee, W. Ku, I. A. Zaliznyak, “Effect of covalent bonding on magnetism and the missing neutron intensity in copper oxide compounds”, *Nature Physics* **5**, 867 (2009).
- [31] A. Yu. Cherny, J.-S. Caux and J. Brand, “Decay of superfluid currents in the interacting one-dimensional Bose gas”, *Phys. Rev. A* **80**, 043604 (2009).
- [32] J.-S. Caux, “Correlation functions of integrable models: a description of the ABACUS algorithm”, *J. Math. Phys.* **50**, 095214 (2009).
- [33] A. Faribault, P. Calabrese and J.-S. Caux, “Bethe Ansatz approach to quench dynamics in the Richardson model”, *J. Math. Phys.* **50**, 095212 (2009).
- [34] J.-S. Caux, A. Klauser, J. van den Brink, “Polarization Suppression and Nonmonotonic Local Two-Body Correlations in the Two-Component Bose Gas in One Dimension”, *Phys. Rev. A* **80**, 061605 (2009).

- [35] J. Mossel and J.-S. Caux, “Relaxation dynamics in the gapped XXZ spin-1/2 chain”, *New J. Phys.* 12, 055028 (2010).
- [36] A. Faribault, P. Calabrese and J.-S. Caux, “Dynamical correlation functions of the mesoscopic pairing model”, *Phys. Rev. B* 81, 174507 (2010).
- [37] J. Mossel, G. Palacios and J.-S. Caux, “Geometric quenches in quantum integrable models”, *J. Stat. Mech.: Th. Exp.* L09001 (2010).
- [38] J.-S. Caux, H. Konno, M. Sorrell and R. Weston, “Tracking the effects of interactions on spinons in gapless Heisenberg chains”, *Phys. Rev. Lett.* 106, 217203 (2011).
- [39] J.-S. Caux and J. Mossel, “Remarks on the notion of quantum integrability”, *J. Stat. Mech.: Th. Exp.* P02023 (2011).
- [40] A. Klauser, J. Mossel, J.-S. Caux and J. van den Brink, “The Spin-Exchange Dynamical Structure Factor of the S=1/2 Heisenberg Chain”, *Phys. Rev. Lett.* 106, 157205 (2011).
- [41] A. Shashi, L. I. Glazman, J.-S. Caux and A. Imambekov, “Nonuniversal prefactors in correlation functions of 1D quantum liquids”, *Phys. Rev. B* 84, 045408 (2011).
- [42] A. Klauser and J.-S. Caux, “Equilibrium thermodynamic properties of interacting two-component bosons in one dimension”, *Phys. Rev. A* 84, 033604 (2011).
- [43] K.C. Rule, D.A. Tennant, J.-S. Caux, M.C.R. Gibson, M.T.F. Telling, S. Gerischer, S. Süllo, M. Lang, “The dynamics of azurite  $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$  in a magnetic field as determined by neutron scattering”, *Phys. Rev. B* 84, 184419 (2011).
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### Proceedings

- [1] M. J. Bhaseen, J.-S. Caux, I. I. Kogan and A. M. Tsvelik, “Disordered Dirac fermions: three different approaches”, in *Proceedings of the NATO Advanced Study Institute on “New Theoretical Approaches to Strongly Correlated Systems”*, Ed. A. M. Tsvelik, Kluwer Academic Publishers, 2001.
- [2] J.-S. Caux, H. Saleur and F. Siano, “Two-boundary integrability and the Josephson current in a Luttinger liquid”, in *Proceedings of the NATO Advanced Workshop on “Statistical Field Theories”*, Eds A. Cappelli and G. Mussardo, “Statistical Field Theories”, volume 73 of NATO Science Series, pp. 119-128, Kluwer, 2002.

- [3] R. Hagemans, J.-S. Caux and J. M. Maillet, “How to calculate correlation functions of Heisenberg chains”, proceedings of the ”Tenth Training Course in the Physics of Correlated Electron Systems and High-Tc Superconductors”, Salerno, Oct. 2005, in “Lectures on the physics of highly correlated electron systems X”, eds. A. Avella, F. Mancini, pp. 245, AIP Conference Proceedings 846 (2006), pp. 245 - 254 (cond-mat/0611467).
- [4] J. Sirker, R. G. Pereira, J.-S. Caux, R. Hagemans, J. M. Maillet, S. R. White and I. Affleck, “Boson decay and the dynamical structure factor for the XXZ chain at finite magnetic field”, proceedings of the SCES conference (2007), Physica B 403, 1520 (2008).
- [5] A. Yu. Cherny, J.-S. Caux and J. Brand, “Drag Force and Hess-Fairbank Effect in the One-Dimensional Bose Gas”, J. Sib. Fed. Univ. Math. Phys. 3, 289 (2010).
- [6] S. de Baerdemacker, V. Hellemans, R. van den Berg, J.-S. Caux, K. Heyde, M. van Raemdonck, D. Van Neck, P. A. Johnson, “Probing pairing correlations in Sn isotopes using Richardson-Gaudin integrability”, Proceedings of the XX International School on Nuclear Physics, Neutron Physics and Applications, Varna, Bulgaria, 16-22 September, 2013.

### Books

- [1] M. Gaudin (translated by J.-S. Caux), “The Bethe Wavefunction”, Cambridge University Press, 2014.

### Other scientific pieces

- [1] “De dynamica van spin ketens”, piece for the 2005 FOM jaarboek (“Collective and Cooperative Statistical Physical Phenomena” program).
- [2] ‘Highlight’ piece for the 2009 DRSTP yearbook (available online at <http://www1.phys.uu.nl/drstp/Annual%20report%20DRSTP/2009/AR2009.pdf>)
- [3] ‘Highlight’ piece for the 2014 DRSTP yearbook (available online at <http://web.science.uu.nl/DRSTP/Annual%20report%20DRSTP/annualreports.html>)



**TALKS AND PRESENTATIONS****Invited talks at international workshops and conferences (2007 onwards):**

- “The 1D Bose gas: new results from integrability”, workshop on Quantum Gases, Institut Henri Poincaré, Paris, 3 May 2007.
- “The dynamics of Heisenberg spin chains (and of the 1d Bose gas)”, workshop on Highly Frustrated Magnets, Trieste, 8 August 2007.
- “The dynamics of Heisenberg spin chains and 1d Bose gases”, workshop on Strong Correlations in Low Dimensional Transport and Dynamics, Montauk, U.S., 5 September 2007.
- “The dynamics of Heisenberg spin chains and 1d Bose gases”, RAQIS conference, Annecy, 11 September 2007.
- “The 1D Bose gas: new results from integrability”, workshop on Disorder in Condensed Matter and Cold Atoms, Leiden, 28 September 2007.
- “Correlation dynamics, noise and quenches in integrable systems”, Workshop on Quantum noise in strongly correlated systems, Rehovot, Israel, 11 January 2008.
- “Integrability and the Bethe Ansatz: the challenge of correlation functions”, Workshop on Integrability in AdS/CFT, Utrecht, 30 January 2008,
- “Dynamics of Heisenberg spin chains: from the Bethe Ansatz to inelastic neutron scattering”, Workshop on Integrable Quantum Systems, CRM, Montréal, 30 June 2008.
- “Correlation dynamics and quantum quenches in integrable systems”, Brookhaven Conference on Strong Fluctuations in Low Dimensional Systems, Montauk, USA, 3 September 2008.
- “Correlations and quenches in integrable systems”, INTANS Workshop on Correlations and Coherence in Quantum Matter, Evora, Portugal, 13 November 2008.
- “Correlations and quenches in integrable systems”, workshop on Non-equilibrium Dynamics and Correlations in Strongly Interacting Atomic, Optical and Solid State Systems, Institute for Theoretical Atomic, Molecular, and Optical Physics (ITAMP), Harvard-Smithsonian Center for Astrophysics, Cambridge, USA, 26-28 January, 2009.
- “Correlations and quenches in integrable systems: from theory to experiment”, workshop on the Heisenberg Model: Past, Present and Future, 20-27 July 2009, University of Brasilia, Brasilia, Brasil.
- “Correlations and quenches in integrable systems: a list of open problems”, symposium on Geometric Aspects of Quantum Theory and Integrable Systems, 29-30 October 2009, UvA, Amsterdam.
- “In- and out-of-equilibrium dynamics in integrable systems”, winter workshop on Physics in the Plane, Les Houches, France, 28 February 28 - 5 March, 2010.
- “In- and out-of-equilibrium dynamics in integrable systems”, INSTANS Workshop on Time-dependent dynamics and non-equilibrium quantum systems, Budapest, Hungary, 19-22 May, 2010.
- “In- and out-of-equilibrium dynamics in integrable systems”, Workshop on Recent advances in quantum integrable systems, Annecy, France, 15-18 June 2010.
- “Cold atoms in 1d: results, perspectives and challenges from integrability”, Les Houches school on Many-Body Physics with Ultracold Atoms, France, 28 June - 23 July 2010.

- “In- and out-of-equilibrium dynamics of integrable models”, invited talk at STATPHYS 24 (XXIV International Conference on Statistical Physics of the International Union for Pure and Applied Physics (IUPAP)), Cairns, Australia, 19-23 July 2010.
- “Dynamics in one dimension: integrability in and out of equilibrium”, invited talk at the 15th Annual UK Meeting on Integrable Models, Conformal Field Theory and Related Topics, City University, London, 15-16 April 2011.
- “Dynamics in one dimension: integrability in and out of equilibrium”, invited talk at the Workshop on Integrability and its Breaking in Strongly Correlated and Disorderd Systems, Trieste, 23 - 27 May 2011.
- “Quenches in integrable systems”, Workshop on Quantum Quenches and Strongly Correlated Physics, Montauk, U.S., 7 September 2011.
- “One-d quantum dynamics beyond the low-energy approximation”, workshop on Charge and heat dynamics in nano-systems, Laboratoire de Physique des Solides, Orsay, France, 11 October 2011.
- “Exact Luttinger correlation prefactors from integrability”, workshop on CFT, topology and information, Institut Henri Poincaré, Paris, 3 November 2011.
- “A tour of Luttinger liquid theory: past, present and future”, kickoff meeting of the FOM program “The singular physics of 1d electrons”, Twente, 11 November 2011.
- “Cold atoms in 1d: correlations in and out of equilibrium from integrability”, Symposium Quantum Matter & Quantum Information (in honour of Peter Zoller), U. van Amsterdam, 5 January 2012.
- “Correlations and dynamics of 1d cold atoms: integrability in and out of equilibrium”, Workshop on low-dimensional quantum gases out of equilibrium, Minneapolis, USA, 11 May 2012.
- “One-dimensional Bose gases in and out of equilibrium”, Workshop on New quantum states of matter in and out of equilibrium, Galileo Galilei Institute, Firenze, Italy, 23 May 2012.
- “In and out of equilibrium dynamics of isolated quantum systems: results from integrability”, Workshop on Dynamics and thermodynamics of isolated quantum systems, UC Santa Barbara, USA, 23 August 2012.
- “Releasing the trapped 1d Bose gas: from integrability and renormalization to Generalized Gibbs ensembles”, invited talk at the 2013 Joint Meeting of the APS Division of Atomic, Molecular & Optical Physics and the CAP Division of Atomic, Molecular & Optical Physics, Québec, Canada, 4 June 2013.
- “Theories for quantum wires: recent happenings in Luttinger liquid theory”, invited talk at the 14th International Conference on Formation of Semiconductor Interfaces (ICFSI-14), Gyeongju, South Korea, 2 July 2013.
- “Interaction quenches in the 1D Bose gas: from generalized Gibbs ensembles to an exact solution”, invited talk at the “Mathematical Statistical Physics” conference, Kyoto, Japan, 2 August 2013.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, Joint UK-NL meeting, Bristol, 31 August 2013.
- “Correlations and quenches in the one-dimensional Bose gas”, invited talk at the 2013 Conference on Bose-Einstein Condensation: Frontiers in Quantum Gases (BEC2013), Sant Feliu de Guixols, Spain, 10 September 2013.

- “Exact solution for the BEC to repulsive interaction quench in the one-dimensional Bose gas”, invited talk at the Memorial Conference for Adilet Imambekov, Harvard, 21 September 2013.
- “Dynamics in Heisenberg chains: from fractional excitations to new out-of-equilibrium states of matter”, invited talk at the DPG-Fruehjahrstagung, Dresden, 31 March 2014.
- “Exact solutions for quenches in 1d Bose gases and quantum spin chains”, invited talk at the “Emergent Phenomena in the Dynamics of Quantum Matter: Disorder, quenches, simulations, and experiment” conference, CUNY New York, 17 April 2014.
- “Exact solutions for quenches in 1d Bose gases and quantum spin chains”, invited talk at the “Quantum Many-Body Dynamics” workshop, Perimeter Institute, Waterloo, Canada, 15 May 2014.
- “Quantum mechanical systems out of equilibrium”, invited talk at the “Viewpoints on Emergence in Nonequilibrium Systems” meeting, Edinburgh, 23 June 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, invited talk at the “Integrable Systems and Quantum Symmetries” conference, Prague, 26 June 2014.
- “Dynamics in Heisenberg chains: from fractional excitations to new out-of-equilibrium states of matter”, invited talk at the “Integrable Lattice Models and Quantum Field Theories” workshop, Bad Honnef, Germany, 29 June 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, invited talk at the “Integrability and Isomonodromy in Mathematical Physics” workshop, Leiden, 8 July 2014.
- “Exact out-of-equilibrium dynamics in integrable models”, invited talk at the “Field Theory Methods in Low-Dimensional Strongly Correlated Quantum Systems” conference, Trieste, Italy, 29 August 2014.
- “Exact solutions for quenches in the Lieb-Liniger Bose gas and Heisenberg spin chains”, invited talk at the RAQIS conference, Dijon, France, 4 September 2014.
- “Exact solutions for quenches in the Lieb-Liniger Bose gas and Heisenberg spin chains”, invited talk at the “Equilibration and glassiness in classical and quantum systems” workshop, Oxford, U.K., 26 September 2014.
- “Exact solutions of out-of-equilibrium situations in one dimension”, invited talk at the “Non-equilibrium dynamics of low-dimensional electronic systems” workshop, Leipzig, Germany, 15 January 2015.
- “Dynamics and relaxation in integrable quantum spin chains”, invited talk at the “Quantum magnets” workshop, Kolymbari, Greece, 15 September 2015.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, invited talk at the “New Trends in Strongly Entangled Many-Body Systems” Workshop, UCL, London, U.K., 10 November 2015
- “Dynamics and relaxation in integrable quantum systems”, invited talk at the WEH Seminar “Isolated Quantum Many-Body Quantum Systems Out Of Equilibrium”, Bad Honnef, Germany, 30 November 2015
- “Dynamics and relaxation in integrable quantum systems”, Workshop on Quantum Integrable Models in and out of Equilibrium, Isaac Newton Institute, Cambridge, 12 January 2016.

- “Dynamics and relaxation in integrable quantum systems”, Workshop on New approaches to non-equilibrium and random systems, KITP Santa Barbara, 17 February 2016.
- “Dynamics and relaxation in integrable quantum systems”, SIDE 12 conference, St-Adèle, Canada, 9 July 2016.
- “Pulses, quasisolitons and quenches in integrable models”, Conference on Entanglement and Non-Equilibrium Physics of Pure and Disordered Systems, Trieste, 26 July 2016.

**Invited talks (other, 2007 onwards):**

- “The dynamics of Heisenberg spin chains and 1d Bose gases”, Brookhaven, 28 February 2007.
- “The dynamics of quantum spin chains and 1d Bose gases”, Glasgow, 16 April 2007.
- “The dynamics of quantum spin chains and 1d Bose gases”, Edinburgh, 18 April 2007.
- “The dynamics of quantum spin chains and 1d Bose gases”, Orsay, Paris, 3 May 2007.
- “Correlation dynamics in quantum spin chains and 1D Bose gases: from theory to experiment”, Wuppertal, Germany, 7 February 2008.
- “Transmutation and fractionalization, or why  $1 + 1$  isn’t simply 2”, 25 February 2009, talk at the DRSTP High Energy school, Driebergen.
- “Correlations and quenches in integrable systems”, 9 March 2009, theoretical physics colloquium, Groningen.
- “Correlations and quenches in integrable systems”, 17 March 2009, theoretical physics colloquium, Oxford, U.K.
- “Correlations and quenches in integrable systems”, 19 March 2009, theoretical physics colloquium, Birmingham, U.K.
- “Correlations and quenches in integrable systems: from theory to experiment”, 14 May 2009, theoretical physics colloquium, Kaiserslautern, Germany.
- “Correlations and quenches in integrable systems: from theory to experiment”, 28 October 2009, theoretical physics colloquium, Utrecht.
- “In- and out-of-equilibrium dynamics in integrable systems”, 12 Mai 2010, theoretical physics colloquium, Fribourg, Switzerland.
- “One-d quantum systems in and out of equilibrium: new exact results, their applications, and overall perspectives”, Joan van der Waals colloquium, Leiden, 15 October 2010.
- “Dynamics in one dimension: integrability in and out of equilibrium”, invited talk, Aachen, 10 May 2011.
- “Dynamics in one dimension: integrability in and out of equilibrium”, theoretical physics seminar, LPTHE, Paris, 7 July 2011.
- “In and out of equilibrium dynamics in one dimension: from theory to experiment”, theoretical physics seminar, Physics by the Lake summer school, St-Bees, U.K., 27 July 2011.
- “One-d physics in the real world”, general physics colloquium, Paul Scherrer Institute, Villigen, Switzerland, 18 November 2011.
- “Dynamics in one dimension: from integrability and Luttinger liquids to inelastic neutron scattering and beyond”, MPIPKS Dresden, 12 January 2012.

- “Dynamics in one dimension: from integrability and Luttinger liquids to inelastic neutron scattering and beyond”, JPA board meeting, 22 March 2012.
- “Dynamics in one dimension: from integrability to inelastic neutron scattering and beyond”, Seminar P. Nozières, Grenoble, 8 February 2013.
- “Dynamics in one dimension: from integrability to inelastic neutron scattering and beyond”, Theoretical Physics Colloquium, Oxford, 8 May 2013.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, Leiden, 20 November 2013.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, Hannover, 18 December 2013.
- “Correlations and quenches in the one-dimensional Bose gas (Lieb-Liniger model)”, seminar, Vienna, 11 March 2014.
- “Integrable systems in and out of equilibrium: from representation theory to experiments”, talk at the “Quantum Matter and Quantum Information” workshop, UvA, 23 May 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, UvA strings group journal club, 12 September 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, Birmingham, 23 October 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, Munich, 31 October 2014.
- “Dynamics in one dimension: from fractional excitations to exact solutions of out-of-equilibrium situations”, seminar for the Templeton meeting, Leiden, 24 November 2014.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, CEA Saclay, Paris, 30 March 2015.
- “Dynamics in one dimension: from fractional excitations to new out-of-equilibrium states of matter”, seminar, Institut dOptique, Palaiseau, 31 March 2015.
- “The pursuit of exactness in quantum physics”, Fundamental Forces Symposium, Nijmegen, 22 May 2015.
- “Dynamics and relaxation in integrable quantum systems”, seminar, D-ITP meeting, Amsterdam, 18 September 2015.
- “Dynamics and relaxation in integrable quantum systems”, seminar, Orsay, 27 October 2015.
- “The pursuit of exactness in quantum physics”, colloquium, UNAM, Mexico, 18 November 2015.
- “Dynamics and relaxation in integrable systems”, Seminar, Nancy, 23 June 2016.

### Popular talks

- “Transmutation and fractionalization, or when 1 plus 1 isn’t simply 2 in modern condensed matter”, Highlights lecture, UvA, 20 April 2011.
- “Transmutation and fractionalization, or when 1 plus 1 isn’t simply 2”, DRSTP High-Energy school, Driebergen, 25 February 2009.