Davide Emilio Galli
Curriculum Vitae

Associate Professor,
Parallel Computing and Condensed Matter Simulations Laboratory,
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Employment

1998-2004	Technical Collaborator (Parallel Computing and Condensed Matter Simulations Laboratory), Dipartimento di Fisica, Università degli Studi di Milano.
2005-2016	Assistant Professor, Dipartimento di Fisica, Università degli Studi di Milano.
2016-present	Associate Professor, Dipartimento di Fisica, Università degli Studi di Milano.

Academic Degrees

1993	Degree in Physics (Laurea in Fisica), Università degli Studi di Milano
1997	Ph.D. in Physics (Dottorato di Ricerca in Fisica), Università degli Studi di Milano
2014	National Scientific eligibility (abilitazione scientifica nazionale) to Associate Professor, 02/B2 sector (Theoretical Condensed Matter Physics)

Scholarships, Fellowships & Grants

1995	Summer school: “Monte Carlo and Molecular Dynamics of Condensed Matter System”, Como (Italy), 3-28 July
1995	Course: “Parallel programming for Cray T3D”, CINECA, Bologna (Italy), 6-10 February

1997 January-April	Post-Graduate Fellowship, INFM (Italian National Institute for the Physics of Matter), Title: “Variational study of excited states in 4He”
May ‘97-April ‘98	Post-Doc Fellowship, INFM (Italian National Institute for the Physics of Matter), Title: “Quantum simulations of 4He” as part of the INFM Supercomputing project “Advanced quantum simulations of strongly interacting systems: Condensed phases of 3He and 4He and Coulombic systems”
1998 May-June	Post-Doc Fellowship, Physics Department, Università degli Studi di Milano
2004	CINECA Consortium Supercomputing Grant: “Liquid and Solid 4He in Confined Geometries”, 12000 CPU hours
2005	CINECA Consortium Supercomputing Grant: “Investigation on the Supersolid State of Matter in Solid 4He”, 12.000 CPU hours
2006	CINECA Consortium Supercomputing Grant: “Quantum Monte Carlo investigation of solid 4He and confined 4He systems”, 15.000 CPU hours
2007	CINECA Consortium Supercomputing Grant: “Path Integral Study of the Ground State of Quantum Solids”, 5.000 CPU hours
2008	CINECA Consortium Supercomputing Grant: “Study of Yukawa Boson Systems in two dimension”, 10.000 CPU hours
2010	Regione Lombardia and CILEA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Quantum vIP: Quantym Dynamics via Inverse Problems”, 270.000 CPU hours
2011	Regione Lombardia and CILEA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Quantum vIP: Quantym Dynamics via Inverse Problems”, 350.000 CPU hours
2013	Regione Lombardia and CINECA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Structure and Dynamics via Inverse Problems (SDvIP)”, 1.232.000 CPU hours
2013	Regione Lombardia and CINECA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Development Grant: “Fermionic Dynamics on Fermi (FDF)”, 100.000 CPU hours
2013	Regione Lombardia and CINECA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Fermionic Dynamics on Fermi (FDF)”, 2.400.000 CPU hours
2014	Regione Lombardia and CINECA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Ultracold gases, liquids and solids via Quantum Monte Carlo (UltraQMC)”, 3.000.000 CPU hours

2016	Regione Lombardia and CINECA Consortium through a LISA Initiative (Laboratory for Interdisciplinary Advanced Simulation) Grant: “Powerfully Unveiling Microscopic Atomic Structures (PUMAS)”, 300.000 CPU hours
2018	CINECA Consortium ISCRA-B Grant: “Memetic Phase Retrieval: hybrid stochastic optimization in Coherent Diffraction Imaging (MEMETICO)”, 4.000.000 CPU hours
2019	CINECA Consortium ISCRA-C Grant: “Resistive switching in Electric Networks of Nanostructured Assemblies (RENNA)” 360.000 CPU hours

Consulting & other professional activities

1998-1999	Scientifc tutor of the project: “Building a cluster of Personal Computers as a facility for Parallel Computing”, insede the project “Borse di studio professionalizzanti per le aree del Centro–Nord” of INFM (Italian National Institute for the Physics of Matter) with a two-years post-graduate fellowship (awarded to Dr. A. Vecchio)
1999	Private consulting (Dr. Kunkl): “Solvents evaporation via ventilation”
2000	Consulting, Efficient s.r.l.: “Simulation of spot prices via Monte Carlo simulation of stochastic processes”
2001	Consulting, Efficient s.r.l.: “Portfolio optimization with Genetic Algorithms”
2002	Tutor of the School on “High Performance Computing on January-February Linux Clusters”, ICTP, Trieste, Italy
2004	Professorship: FSE (Fondo Sociale Europeo) professionalizing course on “Simulation methods for the Financial Markets”, 24 hours, Università dell’Insubria, Como, Italy

Memberships

1994-2004	INFM (National Institute for the Physics of Matter)
2005-2012	CNISM (Consorzio Nazionale Interuniversitario per le Scienze della Materia)

Teaching

Courses taught

Period	Course	Responsabilities
1997 Università dell'Insubria	Structure of Matter	Exercises
2000-2007 Doctorate School in Physics Università degli Studi di Milano	Computational Physics	Lectures
2009-2010 Doctorate School in Physics Università degli Studi di Milano	Computational Physics	Lectures
2005-2011 Università degli Studi di Milano	Physics of Superfluids	Lectures
2005-2008 Università degli Studi di Milano	Computing Laboratory II	Numerical-exercises
2009 Università degli Studi di Milano	Numerical Treatment of Experimental Data	Numerical-exercises
2011-2016 Università degli Studi di Milano	Statistical Physics	Lectures
2013-2018 Università degli Studi di Milano	Physics (Medicina Veterinaria)	Lectures
2016-2017 Doctorate School in Physics Università degli Studi di Milano	Computational Physics	Lectures
2016-present Università degli Studi di Milano	Laboratory of Numerical Treatment of Experimental Data	Numerical-exercises
2016-2018	Computational Physics Laboratory	Lectures
2017-present Università degli Studi di Milano	Advanced Statistical Physics	Lectures

2019-present Università degli Studi di Milano	Numerical Simulation Laboratory	Lectures + Numerical-exercises

Modules taught

Period	Module	Course
2000-2004 Università degli Studi di Milano	Molecular Dynamics and Monte Carlo simulation techniques	Physics of Liquids (Prof. L. Reatto)
2000-2005 Università degli Studi di Milano	Introduction to Parallel Computing and Parallel Programming	Comput. Physics (Prof. R. Ferrari)

Stages

Period	Title	Addressee
2005-2006 Università degli Studi di Milano	Molecular Dynamics simulations form the liquid to the solid state of matter	High School students

Student support

Period	Argument	Level	Role
2001	Genetic Algorithm & Variational Monte Carlo	Graduate thesis	External Supervisor
2002	Quantum Monte Carlo simulations of 4He nano-droplets doped with ions	Graduate thesis	Vice Supervisor
2005	Quantum Monte Carlo simulations of 4He adsorbed on graphite	Graduate thesis	Vice Supervisor
2005	Superfluidity in quantum solids	Bachelor thesis	Supervisor
2005	Excited states in solid 4He	Graduate thesis	Supervisor
2006	the Shadow Path Integral State method	Bachelor thesis	Supervisor

2006	Grain boundaries properties in solid 4He	Graduate thesis	Supervisor
2007	One-body density matrix in two-dimensional 4He	Bachelor thesis	Supervisor
2008	Quantum Monte Carlo studies of Yukawa systems in two dimensions	Graduate thesis	Supervisor
2009	Zero point motion of transverse phonons in solid 4He	Master thesis	Supervisor
2009	Inverse Problems and Quantum Dynamics	Master thesis	Supervisor
2009-2012	Two-dimensional and novel quasi-two-dimensional quantum liquids	Ph.D. thesis	Supervisor
2009-2010	Excited states properties from imaginary time correlation functions	Bachelor thesis	Supervisor
2009-2010	An apparatus for experiments with Bose-Einstein condensates with tunable interaction	Master thesis	Supervisor
2009-2010	Weakly interacting Bose-Einstein condensates in optical lattices	Master thesis	Supervisor
2010-2011	Quantum Monte Carlo study of normal 3He via imaginary time correlation functions	Master thesis	Supervisor
2010-2011	Correlation functions and quantum dynamics at finite temperature: the 4He case	Master thesis	Supervisor
2011-2015	Ground state and excited states of fermionic systems from imaginary time dynamics in configurational and determinantal spaces	Post-doc	Supervisor
2011-2014	Microscopic studies of static and dynamic properties in quantum liquids and gases	Ph.D. thesis	Supervisor

2012	Genetic inversion via falsification of theories applied to particle-sizing	Bachelor thesis	Supervisor
2012	Auxiliary Fields Quantum Monte Carlo: application to the 2D electron gas	Master thesis	Supervisor
2012	Realizzazione sperimentale di un gas quantistico degenere di atomi di Itterbio	Master thesis	Supervisor
2012	Josephson effect in atomic Bose-Einstein condensates with tunable interaction	Master thesis	Supervisor
2012	Ab-initio low energy dynamics of 2D superfluid 4He	Bachelor thesis	Supervisor
2012-2015	Dynamical properties of many body systems from Quantum Monte Carlo simulations	Ph.D. thesis	Supervisor
2013-2017	Monte Carlo methods for path integral calculations of diagonal and off-diagonal properties in fermionic systems	Post-doc	Supervisor
2013	Anchilografia: ricostruzioni tridimensionali da single immagini di diffrazione	Bachelor thesis	Supervisor
2014	Simulazione del modello di Ising 2D su processore grafico	Bachelor thesis	Vice Supervisor
2014	Ricostruzione di oggetti mediante algoritmo di phase retrivial da misure di diffrazione di luce laser	Bachelor thesis	Vice Supervisor
2014	Microscopic characterization of undercooled argon-kripton liquid mixtures via Molecular Dynamics simulations	Bachelor thesis	Supervisor
2015	Analisi storica della correlazione istantanea tra processi stocastici	Bachelor thesis	Supervisor
2015	Quantum Monte Carlo study of excitations in a one-dimensional system of soft spheres	Master thesis	Supervisor

2015	Progettazione e implementazione di algoritmi di ottimizzazione stocastica per il recupero della fase	Master thesis	Supervisor
2015	Realizzazione di potenziali ottici uniformi per gas quantistici atomici	Master thesis	Supervisor
2015-2018	High Performance Computational Intelligence for Coherent Diffraction Data Analysis and Imaging	Ph.D. thesis	Supervisor
2016	Studio delle proprietà dinamiche di un sistema 2D di Bosoni di Yukawa con metodi Quantum Monte Carlo	Bachelor thesis	Supervisor
2016	Microscopic study of Kelvin waves in superfluid ^{4}He	Master thesis	Supervisor
2016	Stochastic models for self-organized criticality in financial markets	Master thesis	Supervisor
2016	Entanglement in quantum spin glasses on a random regular geometry	Master thesis	Supervisor
2016	Microscopic Calculation of Landau's free-energy parameters	Master thesis	Supervisor
2016	Optimization of backflow correlations in Jastrow-Slater wave-functions of two-dimensional Fermi gases	Master thesis	Supervisor
2017	Financial bubbles: genesis and detection within the JLS model framework	Master thesis	Supervisor
2017	A Comparison Between Monte Carlo and Quasi-Monte Carlo Methods in Finance: Nested Simulations for Counterparty Credit Risk	Master thesis	Supervisor
2017	Curvature-induced pressure differences in microswimmer suspensions	Master thesis	Supervisor

2017	Development of intelligent operators for memtic algorithms applied to the phase problem	Bachelor thesis	Supervisor
2017	Microscopic study of the structural phase transition in supercooled Argon-Krypton liquid mixtures	Master thesis	Supervisor
2017	Quantum Monte Carlo study of cluster phases in 1D systems of soft rods	Master thesis	Supervisor
2017	Comparison between financial bubble models: theory and application	Master thesis	Supervisor
2017	Simulations of the freezing of silicon	Master thesis	Supervisor
2018	Implementation of deterministic algorithms for a memetic approach in Coherent Diffraction Imaging	Bachelor thesis	Supervisor
2018	Field theory approach to superfluid properties of weakly-interacting bosons in two dimensions	Master thesis	Supervisor
2018	Studio del regime critico di clusterizzazione in sistemi di materia soffice monodimensionali	Master thesis	Supervisor
2018	Development of a Monte Carlo code for the simulation of trivalent soft patchy particles	Bachelor thesis	Supervisor
2018	Collisions of quantum droplets in ultracold atomic mixtures	Master thesis	Supervisor
2019	Study of emergent phenomena in the cluster phase of two-dimensional soft matter	Master thesis	Supervisor
2019	Manipulating ultracold atomic Fermi gases with tailored optical potentials	Master thesis	Supervisor
2019	Modelling and simulation of electric transport in nanostructures	Bachelor thesis	Supervisor

Services & Contributions to Administration and Management

1999	Planning and building a Beowulf cluster for the Parallel Computing and Condensed Matter Simulation Laboratory (16 nodes, Pentium II), Physics Department, Università degli Studi di Milano
2000	Planning and building a cluster of personal computers with diskless clients to consult the on-line catalogue of the Physics Department Library, Università degli Studi di Milano
2001-2004	Local Contact – G Section, Milano Research Unit, INFM (National Institute for the Physics of Matter)
2003	Planning and building a Beowulf cluster for the Parallel Computing and Condensed Matter Simulation Laboratory (24 nodes, Pentium 4), Physics Department, Università degli Studi di Milano
2005-2014	"Computing" Committee member, Physics Department, Università degli Studi di Milano
2006-2011	Steering Committee member (Italian guest delegate), of the European Science Fundation scientific program "MOLECULAR SIMULATIONS IN BIOSYSTEMS AND MATERIAL SCIENCE" (SIMBIOMA, May 2006-May 2011)
2007	Planning and building a Beowulf cluster for the Parallel Computing and Condensed Matter Simulation Laboratory (9 nodes, Quad-cores Intel-Q6700), Physics Department, Università degli Studi di Milano
2009	Organizing Committee member: XIV National congress of Statistical Physics, Physics Department, Università di Parma
2011-present	Referee of some international scientific journals: Physical Review, Journal of Chemical Physics, Journal of Low Temperature Physics, New Journal of Physics, European Physics Journal.
2013-present	International Advisory Committee member: series of international conferences on Recent Progress in Many Body Theories (RPMBT/MBT)
2017-present	"Giunta di Dipartimento" Committee member, Physics Department, Università degli Studi di Milano

Research Interests

- Monte Carlo and Quantum Monte Carlo simulations of many-particle systems and stochastic processes
- Theory of superfluids, quantum liquids, solids and gases
- Theoretical methods for quantum many-body systems
- Machine Learning, Stochastic Optimization methods
- Statistical methods for Inverse Problems
- Phasing Algorithms and Coherent Diffraction Imaging
- Parallel computing

Publications

Books

1. Title: Theory and Simulation of Random Phenomena.
   Subtitle: Mathematical Foundations and Physical Applications
   Authors: Ettore Vitali, Mario Motta, Davide Emilio Galli
   ISBN ebook: 978-3-319-90515-0
   ISBN: 978-3-319-90514-3
   DOI: 10.1007/978-3-319-90515-0
   Series: UNITEXT for Physics Series ISSN: 2198-7882
   Publisher: Springer International Publishing
   Year: 2018
   Edition Number: 1

Journal Articles

1. *"Variational Theory of Rotons in Superfluid 4He"*, D.E. Galli, L. Reatto and S.A. Vitiello, J. Low Temp. Phys. 101, 755 (1995).
2. *"Rotons and Roton Wave Packets in Superfluid 4He"*, D.E. Galli, E. Cecchetti and L. Reatto, Phys. Rev. Lett. 77, 5401 (1996).
3. *"Roton wave-packets in 3-Dimensional and 2-Dimensional 4He"*, D.E. Galli and L. Reatto, J. Low Temp. Phys., 110, 437 (1997)
4. *"What is a Roton?"*, D.E. Galli and L. Reatto, Int. Journal of Mod. Phys. B. vol. 13, pp. 607-616 (1999).
5. *"Variational Theory of bulk 4He with Shadow Wave Function: round state and the phonon-maxon-roton spectrum"*, S. Moroni, D.E. Galli, S. Fantoni and L. Reatto, Phys. Rev. B58, 909 (1998).
6. *"Fluctuations and BEC at the free surface of 4He"*, D.E. Galli and L. Reatto, J. Low Temp. Phys., 113, 223 (1998).
7. *"Variational calculation of excited-state properties of a 3He impurity in superfluid 4He"*, D.E. Galli, G.L. Masserini and L.Reatto Phys. Rev. B60, 3476 (1999).
8. *"Fluctuation effects at the free surface of superfluid 4He"*, D.E. Galli and L. Reatto, J. of Phys.: Condensed Matter 12, 6009 (2000).
9. *"Vacancies in solid 4He and Bose Einstein Condensation"*, D.E. Galli and L.Reatto, J. Low Temp. Phys., 124, (2001).
10. *"Heavy isotope 6He: Properties of bulk system and of clusters"*, D.E. Galli and L.Reatto, Phys. Rev. B63, 214515 (2001).
11. *"Alkali ions in superfluid 4He and structure of the snowball"*, M. Buzzacchi, D.E. Galli and L. Reatto, Phys. Rev. B64 094512-1 (2001).
12. *"Pure and alkali-ion-doped droplets of 4He"*, D.E. Galli, M. Buzzacchi and L. Reatto, J. Chem. Phys. 115, 10239 (2001).
13. *"Variational Monte Carlo Calculations of 4He Adsorbed on Graphite"*, M. Buzzacchi, D.E. Galli and L. Reatto, J. Low Temp. Phys. 126, 205 (2002).
14. *"Bose-Einstein condensation and excitations in solid 4He with vacancies"*, D.E. Galli and L. Reatto, Int. Journal of Mod. Phys. B. vol. 17, pp. 5243-5253 (2003).
15. *"Recent progress in simulation of the ground state of many Boson systems"*, D.E. Galli and L. Reatto, Mol. Phys. 101, 1697 (2003).
16. *"Vacancy excitation spectrum in solid 4He and longitudinal phonons"*, D.E. Galli and L. Reatto, Phys. Rev. Lett. 90, 175301/1 (2003).
17. *"Disorder Phenomena in Quantum Solids with Vacancies"*, D.E. Galli and L. Reatto, J. Low Temp. Phys. 134, 121 (2004).
18. *"Alkali and alkali-earth ions in 4He systems"*, M. Rossi, M. Verona, D.E. Galli and L. Reatto, Phys. Rev. B69, 212510 (2004).
19. *"The Shadow Path Integral Ground State Method: Study of Confined Solid 4He"*, D.E.

Galli and L. Reatto, J. Low Temp. Phys. 136, 343 (2004).

20. *"Bose-Einstein condensation in solid 4He"*, D.E. Galli, M. Rossi, and L. Reatto, Phys. Rev. B71, 140506 (2005).
21. *"Layer by layer solidification of 4He in narrow porous media"*, M. Rossi, D.E. Galli and L. Reatto, Phys. Rev. B72, 064516 (2005).
22. *"Bose-Einstein Condensation of Incommensurate Solid 4He"*, D.E. Galli, and L. Reatto, Phys. Rev. Lett. 96, 165301 (2006).
23. *"Bose-Einstein condensation in bulk and confined solid Helium"*, L. Reatto, M. Rossi, and D.E. Galli, Int. Journal of Mod. Phys. B. vol. 20, pp. 5081-5092 (2006).
24. *"Pressurized 4He in cylindrical and hexagonal pores"*, M. Rossi, D.E. Galli and L. Reatto, J. Low Temp. Phys. 146, 95 (2007).
25. *"Two-body Correlations and the Superfluid Fraction for Nonuniform Systems"*, W.M. Saslow, D.E. Galli, and L. Reatto, J. Low Temp. Phys. 149, 53 (2007).
26. *"Bounds for the Superfluid Fraction from Exact Quantum Monte Carlo Local Densities"*, D.E. Galli, L. Reatto, and W.M. Saslow, Phys. Rev. B76, 052503 (2007).
27. *"Path integral ground state study of two-dimensional solid 4He"*, E. Vitali, M. Rossi, F. Tramonto, D.E. Galli, and L. Reatto, Phys. Rev. B77, 180505(R) (2008).
28. *"Solid 4He and the Supersolid Phase: from Theoretical Speculation to the Discovery of a New State of Matter? A Review of the Past and Present Status of Research"*, D.E. Galli, and L. Reatto, J. Phys. Soc. Jap. 77, 111010 (2008).
29. *"Zero-Point Vacancies in Quantum Solids"*, M. Rossi, E. Vitali, D.E. Galli, and L. Reatto, J. Low Temp. Phys. 153, 250 (2008).
30. *"Exact ground state Monte Carlo method for Bosons without importance sampling"*, M. Rossi, M. Nava, L. Reatto, and D.E. Galli, J. Chem. Phys. 131, 154108 (2009).
31. *"Quantum dislocations: the fate of multiple vacancies in two-dimensional solid 4He"*, M. Rossi, E. Vitali, D.E. Galli, and L. Reatto, J. of Phys.: Condensed Matter 22, 145401 (2010).
32. "*Ab initio low-energy dynamics of superfluid and solid 4He*", E.Vitali, M. Rossi, L. Reatto, and D.E. Galli, Phys. Rev. B 82, 174510 (2010).
33. "Accurate Density Response Function of Superfluid 4He at Freezing Pressure: Is DFT Succssful for Superfluid Freezing?", T. Minoguchi and D.E. Galli, J. Low Temp. Phys. 162, 160 (2011).
34. "Path Integral Monte Carlo study of ^{4}He clusters doped with alkali and alkali-earth ions", D.E. Galli, D.M. Ceperley, and L. Reatto, J. Phys. Chem. A 115, 7300 (2011).
35. "Off-diagonal long-range order studied in a soft-core solid: Two-dimensional screened Coulomb bosons", M. Rossi, S.L. Zavattari, D.E. Galli, and L. Reatto, Phys. Rev. B 84, 052504 (2011).
36. "Long-range correlations in quantum solids", E. Vitali, P. Arrighetti, M. Rossi, and D.E. Galli, Mol. Phys. 109, 2855 (2011).
37. "Microscopic characterization of overpressurized superfluid ^{4}He", M. Rossi, E. Vitali, L. Reatto, D.E. Galli, Phys. Rev. B 85, 014525 (2012).
38. "Study of solid ^{4}He in two dimensions. The issue of zero-point defects and study of confined crystal", M. Rossi, L. Reatto and D.E. Galli, J. Low Temp. Phys. 168, 235 (2012).
39. "Equation of state of two-dimensional ^{3}He at zero temperature" M. Nava, A. Motta, D.E. Galli, E. Vitali, and S. Moroni, Phys. Rev. B 85, 184401 (2012).
40. "Adsorption of He isotopes on fluorographene and graphane: Fluid and superfluid phases from quantum Monte Carlo calculations", M. Nava, D.E. Galli, M.W. Cole, L. Reatto, Phys. Rev. B 86, 174509 (2012).
41. "Density Functional Theory and Bose Statistics for the Freezing of Superfluid ^{4}He" T. Minoguchi, M. Nava, F. Tramonto, D.E. Galli, J. Low Temp. Phys. 171, 259 (2013) - DOI 10.1007/s10909-012-0824-z (2012).
42. "Superfluid State of ^{4}He on Graphane and Graphene–Fluoride: Anisotropic Roton States" M. Nava, D.E. Galli, M.W. Cole, L. Reatto, J. Low Temp. Phys. 171, 699 (2013) - DOI 10.1007/s10909-012-0770-9 (2012).
43. "Dynamic structure factor for ^{3}He in two dimensions", M. Nava, D.E. Galli, S. Moroni,

and E. Vitali, Phys. Rev. B 87, 144506 (2013).

44. “Excitation spectrum in two-dimensional superfluid ^{4}He”, F. Arrigoni, E.Vitali, D.E. Galli, L. Reatto, Low Temp. Phys./Fizika Nizkikh Temperatur, 39 1021 (2013).
45. “Novel behavior of monolayer quantum gases on graphene, graphane and fluorographene”, L. Reatto, D.E. Galli, M. Nava, M.W. Cole, J. Phys.: Condens. Matter 25, 443001 (2013).
46. “Quantum Monte Carlo study of the dynamic structure factor in the gas and crystal phase of hard-sphere bosons”, R. Rota, F. Tramonto, D.E. Galli, S. Giorgini, Phys. Rev. B 88, 214505 (2013).
47. “Imaginary time correlations and the phaseless auxiliary field quantum Monte Carlo", M. Motta, D.E. Galli, S. Moroni, and E. Vitali, J. Chem. Phys. 140, 024107 (2014).
48. "Observation of crystallization slowdown in supercooled parahydrogen and orthodeuterium quantum liquid mixtures", M. Kühnel, J.M. Fernández, F. Tramonto, G. Tejeda, E. Moreno, A. Kalinin, M. Nava, D.E. Galli, S. Montero and R.E. Grisenti, Phys. Rev. B 89, 180201(R) (2014).
49. “Quantum Monte Carlo study of a vortex in superfluid ^{4}He and search for a vortex state in the solid” D.E. Galli, L. Reatto, and M. Rossi, Phys. Rev. B 89, 224516 (2014).
50. “Path Integral Monte Carlo study confirms a highly ordered snowball in 4He nanodroplets doped with an Ar+ ion” F. Tramonto, P. Salvestrini, M. Nava, D.E. Galli, J. Low Temp. Phys. 180, 29 (2015).
51. “Implementation of the Linear Method for the optimization of Jastrow-Feenberg and backflow correlations”, M. Motta, G. Bertaina, D.E. Galli, E. Vitali, Comp. Phys. Comm. 190, 62 (2015).
52. “Condensed phase of Bose-Fermi mixtures with a pairing interaction”, A. Guidini, G. Bertaina, D.E. Galli, P. Pieri, Phys. Rev. A 91, 023603 (2015).
53. “Mixing effects in the crystallization of supercooled quantum binary liquids”, M. Kühnel, J.M. Fernández, F. Tramonto, G. Tejeda, E. Moreno, A. Kalinin, M. Nava, D.E. Galli, S. Montero and R.E. Grisenti, J. Chem. Phys. 143, 064504 (2015).
54. “Imaginary time density-density correlations for two-dimensional electron gases at high density”, M. Motta, D.E. Galli, S. Moroni, E. Vitali, J. Chem. Phys. 143, 164108 (2015).
55. “Dynamics of charge migration in poly (para-phenylene vinylene) films and nanocomposites with single walled carbon nanotubes”, E. Mulazzi, D.E, Galli, S. Lefrant, J. Wéry, F. Massuyeau and E. Faulques, J. Phys.: Cond. Matt. 28, 045304 (2016).
56. “Low-density phases of ^{3}He monolayers adsorbed on graphite”, M. Ruggeri, E. Vitali, D. E. Galli, M. Boninsegni, S. Moroni, Phys. Rev. B 93, 104102 (2016).
57. “One-dimensional liquid ^{4}He: dynamical properties beyond Luttinger-liquid theory”, G. Bertaina, M. Motta, M. Rossi, E. Vitali, D.E. Galli, Phys. Rev. Lett. 116, 135302 (2016).
58. “Roton Excitations and the Fluid–Solid Phase Transition in Superfluid 2D Yukawa Bosons”, S. Molinelli, D.E. Galli, L. Reatto, M. Motta, J. Low Temp. Phys. 185, 39 (2016).
59. “Quasi-One-Dimensional Electronic States Inside and Outside Helium-Plated Carbon Nanotubes”, M. Motta, D.E. Galli, M. Liebrecht, A. Del Maestro, M.W. Cole, J. Low Temp. Phys. 185, 161 (2016).
60. “Dynamical structure factor of one-dimensional hard rods”, M. Motta, E. Vitali, M. Rossi, D. E. Galli, and G. Bertaina, Phys.Rev. A 94, 043627 (2016).
61. “Linear Response of One-Dimensional Liquid ^{4}He to External Perturbations”, M. Motta, G. Bertaina, E. Vitali, D. E. Galli, M. Rossi, J. Low Temp. Phys. 187, 419 (2017).
62. “Microscopic Study of Static and Dynamical Properties of Dilute One-Dimensional Soft Bosons”, M. Teruzzi, D. E. Galli, G. Bertaina, J. Low Temp. Phys. 187, 719 (2017).
63. “Facing the phase problem in Coherent Diffractive Imaging via Memetic Algorithms”, A. Colombo, D.E. Galli, L. De Caro, F. Scattarella, and E. Carlino, Scientific Reports 7, 42236 (2017).
64. “Statistical and computational intelligence approach to analytic continuation in Quantum Monte Carlo.”, G. Bertaina, D.E. Galli, E. Vitali, Adv. Phys. X 2, 302 (2017) DOI: 10.1080/23746149.2017.1288585.

65. “Quantum Critical Behavior of One-Dimensional Soft Bosons in the Continuum”, S. Rossotti, M. Teruzzi, D. Pini, D. E. Galli, and G. Bertaina, Phys. Rev. Lett. 119, 215301 (2017).
66. “Probing quantum turbulence in ^{4}He by quantum evaporation measurements”, I. Amelio, D. E. Galli, L. Reatto, Phys. Rev. Lett. 121, 015302 (2018), DOI: 10.1103/PhysRevLett.121.015302.
67. “Coherent diffraction imaging in Transmission Electron Microscopy for Atomic Resolution Quantitative Studies of the Matter”, E. Carlino, F. Scattarella, L. De Caro, C. Giannini, D. Siliqi, A. Colombo, D. E. Galli, Materials 11, 2323 (2018), DOI: 10.3390/ma11112323.

Peer-reviewed Conference Proceedings

1. *“Excitation Spectrum of a 3He impurity in Superfluid 4He”*, D.E. Galli, G.L. Masserini, S.A. Vitiello and L. Reatto, Czech. J. Phys. 46 (S1), 295 (1996).
2. *“Accurate description of Excitations in Superfluid 4He”*, D.E. Galli and L. Reatto, Czech. J. Phys. 46 (S1), 297 (1996).
3. *“Variational Monte Carlo Study of Rotons in Superfluid 4He”*, D.E. Galli and L. Reatto, in: “Condensed Matter Theories”, Vol. 12, J.W. Clarkk and P.V. Panat ed., Nova Science Publ. (1997).
4. *“Surface Bose Einstein condensate: clusters and free surface of 4He”*, D.E. Galli and L.Reatto, Physica B 284-8, 152 (2000).
5. *“Local solid order around impurities: doped clusters and ions in 4He”*, C.C. Duminuco, D.E. Galli and L.Reatto, Physica B 284-8, 109 (2000).
6. *“Bose-Einstein condensation in solid 4He with a vacancy”*, D.E. Galli and L.Reatto, Physica B 284-8, 345 (2000).
7. *“Off-Diagonal Long-Range Order in Solid 4He”*, D.E. Galli, M. Rossi, and L. Reatto, AIP Conference Proceedings Vol. 850, pp. 335-336 (2006), ISBN: 0-7354-0347-3.
8. *“Solid 4He in Narrow Porous Media”*, M. Rossi, D.E. Galli and L. Reatto, AIP Conference Proceedings Vol. 850, pp. 356-357 (2006), ISBN: 0-7354-0347-3.
9. *“Transverse Phonon Frequencies in bcc Solid 4He”*, G. Mazzi, D.E. Galli and L. Reatto, AIP Conference Proceedings Vol. 850, pp. 354-355 (2006), ISBN: 0-7354-0347-3.
10. *“Microscopic Studies of Solid 4He with Path Integral Projector Monte Carlo”*, M. Rossi, R. Rota, E. Vitali, D.E. Galli, and L. Reatto, Series on Advances in Quantum Many Body Theory, Vol.11, pp. 300-311 (World Scientific, 2008).
11. *“Liquid-solid transition in Bose systems at T=0 K: Analytic results about the round state wave function”*, E. Vitali, D.E. Galli, and L. Reatto, Series on Advances in Quantum Many Body Theory, Vol.11, pp. 251-254 (World Scientific, 2008).
12. *“Zero-temperature study of vacancies in solid 4He”*, M. Rossi, E. Vitali, D.E. Galli and L. Reatto, J. Phys.: Conference Series 150, 032090 (2009).
13. *“Real time dynamics from quantum Monte Carlo data: A genetic algorithm approach”*, E. Vitali, D.E. Galli and L. Reatto, J. Phys.: Conference Series 150, 032116 (2009).
14. “*Quantized vortices in two dimensional solid ^{4}He*”, M. Rossi, D.E. Galli, P. Salvestrini and L. Reatto, J. Phys.: Conference Series 400, 012063 (2012).
15. “*Novel substrates for Helium adsorption: Graphane and Graphene-Fluoride*”, L. Reatto, M. Nava, D.E. Galli, C. Billman, J.O. Sofo and M.W. Cole, J. Phys.: Conference Series 400, 012010 (2012).
16. “*A non-perturbative approach to freezing of superfuid **4**He in density functional theory*” T. Minoguchi, D.E. Galli, M. Rossi and A. Yoshimori, J. Phys.: Conference Series 400, 012050 (2012).
17. “Many-body Bose systems and the hard-sphere model: dynamic properties from the weak to the strong interaction regime”, R. Rota, F. Tramonto, D.E. Galli, and S. Giorgini, J. Phys.: Conference Series 529, 012022 (2014).
18. "Brexit or Bremain? Evidence from bubble analysis", M. Bianchetti, D.E. Galli, C. Ricci, A. Salvatori, M. Scaringi, CEUR workshop proceedings (http://ceur-we.org, ISSN 1613-

0073), Vol-1774, urn:nbn:de:0074-1774-1, pp.43-54 (MIDAS 2016: MIning DAta for financial applicationS, Riva del Garda, Italy, September 19-23, 2016).

19. "Memetic Phase Retrieval and HPC for the Imaging of Matter at Atomic Resolution", A. Colombo, L. De Caro and D. E. Galli, Advances in Parallel Computing, Vol. 32: Parallel Computing is Everywhere, pag. 67-76 (2018); doi: 10.3233/978-1-61499-843-3-67.
20. "Static density response of one-dimensional soft bosons across the clustering transition", M. Teruzzi, D. Pini, S. Rossotti, D. E. Galli, G. Bertaina, J. Phys.: Conference Series J. Phys.: Conf. Ser. 1041, 012009 (2018); doi:10.1088/1742-6596/1041/1/012009.
21. "Feeding genetic heterogeneity via a smart mutation operator in the Memetic Phase Retrieval approach", M. Mauri, D. E. Galli, and A. Colombo, in "Toward a Science Campus in Milan" Springer, ISBN 978-3-030-01629-6; doi: 10.1007/978-3-030-01629-6_15.

Conference Papers & Contributions to Books

1. *"Monte Carlo Variational Theory of condensed phases of 4He"*, D.E. Galli and L. Reatto, in: "Monte Carlo and Molecular dynamics of Condensed Matter Systems", K Binder and G. Ciccotti (Eds.), SIF, Bologna, (1996).
2. *"Advanced quantum simulations of strongly interacting systems: Condensed phases of 3He and 4He"*, L. Reatto, D.E. Galli, S. Fantoni, G. Senatore and S. Moroni, in: "Scienza e Supercalcolo 1997", edited by CINECA (1998).
3. *"Nature of Rotons in Suparfluid 4He"*, E. Cecchetti, D.E. Galli and L. Reatto, INFM Highlights 1996-97 p.70, M. Airoldi and F. Gorini (Eds.), IF s.r.l., Genova (1999).
4. *"Bose Einstein condensation in solid 4He"*, D.E. Galli, M. Rossi, and L. Reatto, "Report 2006", Dipartimento di Fisica, Università degli Studi di Milano.
5. *"Quantum Monte Carlo investigation on the properties of solid 4He"*, M. Rossi, D.E. Galli, G. Mazzi, and L. Reatto, "Scienza e Supercalcolo - Anno 2005", edited by CINECA (2006), ISBN 88-86037-16-3.
6. *"The Shadow Path integral Ground State method: New light into the Physics of Quantum Solids"*, E. Vitali, D.E. Galli and L. Reatto, Research Activities on High Performance Computing Clusters at CILEA 2006, edited by CILEA (2007), ISBN 978-88-88971-12-4.
7. "Microscopic investigation of the crystallization slowdown in supercooled liquid mixtures", F. Mambretti, R. E. Grisenti, D. E. Galli, CINECA HPC Report 2017, ISBN 978-88-86037-38-9.

Invited Talks

- "Vacancies and Bose Einstein condensation in solid 4He", 18th General Conference of the Condensed Matter Division of the European Physical Society, Montreux (Switzerland) 13-17 March 2000
- "Bose-Einstein condensation and excitations in quantum solids with vacancies", 11th International Conference on Recent Progress in Many-Body Theories, UMIST, Manchester 9-13/7/2001.
- "Disordered phenomena in Quantum Solids", QFS2003 Quantum Fluids and Solids International Symposium, Albuquerque, New Mexico (USA) 3-8 August 2003.
- "Disordered phenomena in Quantum Solids", LXXXIX Congresso Nazionale, Societ´a Italiana di Fisica, Parma, Italy 17-22 September 2003.
- "Microscopic studies of confined 4He", 343rd WE-Heraeus-Seminar on helium nanodroplets, Physikzentrum Bad Honnef, Germany March 30-April 1, 2005.
- "Bose Einstein condensation in solid 4He", Highlights in Physics 2005, Congresso di Dipartimento, Dipartimento di Fisica, Università degli Studi di Milano, Milano, Italy 11-

14 Ottobre 2005.

- "Quantum Monte Carlo simulations of solid 4He at zero temperature", The Supersolid state of Matter program, Kavli Institute for Theoretical Physics, University of California Santa Barbara, USA 6-17 February, 2006.
- "The Shadow Path Integral Ground State: method and applications" Quantum Monte Carlo in Italia, Università di Trento, Sardagna (Tn), Italy, 2 December, 2006.
- "Microscopic studies of the ground state of solid 4He with path integral projector Monte Carlo", 14th International Conference on Recent Progress in Many–Body Theories, Technical University of Catalonia (UPC), Barcelona (Spain), 16-20 July 2007.
- "Microscopic studies of 4He solid systems via Path Integral projector methods", Workshop "Supersolid 2008", The Abdus Salam International Centre for Theoretical Physics, Trieste (Italy), 18-22 August 2008.
- "Quantum Monte Carlo study of dynamic properties of ultracold gases" Workshop "Correlations in Ultracold Atomic Systems" Dip. Fisica, Università degli Padova, 26-27 September 2013.
- "Ab-initio microscopic studies of elementary excitations in quantum fluids and gases" Workshop "Quantum Gases, Fluids and Solids (QGFS2014)", IFSC/USP, Sao Carlos (Brazil), 13-17 August (2014).
- "Dynamical correlations in one-dimensional 4He beyond Luttinger theory", Workshop "Physics at the Falls: Phase Transitions in reduced Dimensions", Physics Department, University of Buffalo, Amherst (Buffalo, NY, USA), 12-14 November (2014).
- "Information retrieval in coherent diffractive imaging", International School of Solid State Physics – 68th Course: The Free Electron Laser for Ultrafast Imaging at the Nanoscale, Ettore Majorana Foundation and Centre for Scientific Culture (EMFCSC), Erice (Sicily, Italy) 5-10 June 2016.
- "Role of the interaction core in the excitation spectrum of 1D gases and liquids", International Workshop "Understanding Quantum Phenomena with Path Integrals: From Chemical Systems to Quantum fluids and Solids", The Abdus Salam International Centre for Theoretical Physics, Trieste (Italy), 3-7 July 2017.

Invited Seminars

- "How to build a cluster for Monte Carlo Simulations ", School on High Performance Computing on Linux Clusters, ICTP, Trieste, Italy 31 Gennaio – 15 Febbraio 2002.
- "Quantum Monte Carlo simulations of confined solid ^{4}He", Institute for Solid State Physics, Kashiwa, Japan, 12/3/2004.
- "Quantum Monte Carlo simulations of confined solid ^{4}He", University of Tokyo, Hongo Campus, Tokyo, Japan, 17/3/2004.
- "The supersolid phase. A new phase of matter?", Dipartimento di Fisica, Università degli Studi di Milano, Milano, Italy 24/3/2004.
- "Study of quantum many-body systems: exact ground state and excited state properties via path integral projector Monte Carlo methods", Dipartimento di Matematica, Politecnico di Milano, Milano, Italy ,18/12/2008.
- "Metodi Monte Carlo per la Fisica Quantistica", Iniziativa LISA (Lab. Interdisciplinare per la Simulazione Avanzata), Regione Lombardia, Milano, Italy, 14/01/2013.
- "1D liquid ^{4}He and hard-core systems: dynamical properties beyond Luttinger liquid theory", Dipartimento di Fisica, Università degli Studi di Padova, Padova, Italy, 21/04/2016.
- "1D liquid ^{4}He and hard-core systems: dynamical properties beyond Luttinger liquid theory", Università della Svizzera Italiana, Lugano, Svizzera, 20/06/2016.

Talks

- "Improved description of Maxon-roton excitations in superfluid 4He with Shadow Wave Function", 3RD ESF Workshop: "Network on Quantum Fluids and Solids", ICTP, Trieste, Italy 20-26/4/1995.
- "Variational Monte Carlo for clusters and films of 4He", FORUM-INFM Workshop: "Quantum Monte Carlo simulation of many-body systems: Fermion systems and inhomogeneous systems", Scuola Normale Superiore, Pisa, Italy 19-20/9/1996.
- "Roton excitations in superfluid 4He", Convegno Nazionale di Fisica Teorica e Struttura della Materia, Fai della Paganella, Trento, Italy 23-26/3/1997.
- "Fluctuation effects in a self-bounded quantum system: Clusters and free surface of superfluid 4He", Meeting on "Macroscopic Quantum Coherence Phenomena", Sissa, Trieste, Italy 5-9/7/1999.
- "Cluster di Personal Computer come risorsa di calcolo Parallelo", Linux in education, Milano, Italy 17/12/1999
- "Vacancies and Bose Einstein condensation in solid 4He ", INFMeeting, Genova, Italy 12-16/6/2000.
- "How to build a cluster for Monte Carlo Simulations ", School on High Performance Computing on Linux Clusters, ICTP, Trieste, Italy 31 Gennaio – 15 Febbraio 2002.
- "Alkali–ion–doped clusters of 4He ", 5th Workshop on Quantum Fluid Clusters, ECT , Trento, Italy 16-21/9/2002.
- "Quantum Monte Carlo simulations of confined solid 4He ", Institute for Solid State Physics, Kashiwa, Japan, 12/3/2004.
- "Quantum Monte Carlo simulations of confined solid 4He ", University of Tokyo, Hongo Campus, Tokyo, Japan, 17/3/2004.
- "The supersolid phase. A new phase of matter?", Dipartimento di Fisica, Università degli Studi di Milano, Milano, Italy 24/3/2004.
- "Bose Einstein condensation in solid 4He" LT24 International Conference on Low Temperature Physics, Orlando, Florida, USA 10-17/8/2005.
- "Inverse Problems and Quantum Dynamics: The Genetic Inversion via Falsification of Theories (GIFT) Method", International Conference on Recent Progress in Many-Body Theories 15, Columbus, Ohio (USA) 27-31/7/2009.
- "Quantum Monte Carlo study of quantized vortices in solid Helium", Supersolidity 2011, City University of New York, New York, USA 7-10/6/2011
- "Metodi Monte Carlo per la Fisica Quantistica", Iniziativa LISA (Laboratorio Interdisciplinare per la Simulazione Avanzata), Regione Lombardia, Milano, 14/01/2013
- "Zero-sound mode in a neutral Fermi liquid: Dynamic Fermionic Correlations applied to 2D ^{3}He", FisMat 2013 (Italian National Conference on Condensed Matter Physics), Dip. Fisica, Politecnico di Milano, Milano, 9-13/9/2013

Experiments

- SACLA December 2016 (Japan)
- European-XFEL March 2019 (Germany)

International collaborations

- 2006 – 2007 Prof. W.M. Saslow (Texas A&M University, USA)
- 2006 – 2011 Prof. D.M. Ceperley (University of Illinois at Urbana_ Champaign, USA)
- 2010 - present Dr. T. Minoguchi (University of Tokyo, Japan)
- 2011 – 2017 Prof. M.H. Cole (Penn State University, USA)
- 2012 – present Dr. R. Grisenti (J. W. Goethe-Universität, Germany)
- 2014 – present Prof. J. Boronat (UPC, Technical University of Catalonia, Spain)
- 2015 – present Prof. M. Boninsegni (University of Alberta, Canada)

- 2015 – present Prof. G. E. Astrakharchik (PUCB, Barcelona Spain)
- 2016 – present Prof. A. Del Maestro (University of Vermont, Burlington, USA)

National collaborations

- 1994 – present Prof. L. Reatto (Università degli Studi di Milano)
- 2011 - present Dr. S. Moroni (IOM-CNR DEMOCRITOS and SISSA, Trieste)
- 2012 - present Prof. S. Giorgini (Università degli Studi di Trento)
- 2014 - present Dr. E. Carlino (IOM-CNR Laboratorio TASC, Trieste)
- 2014 - present Dr. L. De Caro (IC-CNR, Bari)
- 2014 - present Dr. G. Roati (INO-CNR e LENS, Firenze)
- 2016 – present Dr. M. Bianchetti (Intesa Sanpaolo, Università di Bologna)
- 2018 – present Prof. P. Milani (Università degli Studi di Milano)
- 2019 – present Dr. S. Pilati (Università di Camerino)
- 2019 – present Prof. F. Pederiva (Università degli Studi di Trento)

Skills

- Programming ability in C++, C, Fortran 2003/95/77, Python, Julia
- Parallel programming: MPI, Open-MP
- Parallel computation: Beowulf clusters
- Native language: Italian
- Fluent in English