

PUBLICATIONS

Books

[L1] M.L. Chiofalo, Screening effects in bipolaron theory and high-temperature superconductivity, Ed. Scuola Normale Superiore, Pisa 1997.

[L2] G. Iadonisi, R.J. Schrieffer and M. L. Chiofalo Eds., Models and Phenomenology for conventional and high- T_c superconductivity, Proceedings del CXXXVI Corso della Scuola Internazionale di Fisica "Enrico Fermi", IOS (Amsterdam, 1998).

[L3] G. Iadonisi, G. Cantele, M. L. Chiofalo, Introduction to Solid State Physics and Crystalline Nanostructures, SPRINGER VERLAG- Italia (2014) 685 pp. [In preparazione la seconda edizione, da pubblicare per contratto nel 2018].

Articles on international journals with peer-review

[1] G. Iadonisi, M.L. Chiofalo, V. Cataudella and D. Ninno, Plasmon-phonon cooperative effects in the dilute large bipolaron gas: a possible mechanism for high T_c superconductivity, Phys. Rev. B 48, 12966 (1993).

[2] V. Cataudella, G. Iadonisi, D. Ninno and M. L. Chiofalo, On the boson--fermion model of superconductivity, Il Nuovo Cimento D 18, 1307 (1996).

[3] G. Iadonisi, M.L. Chiofalo, V. Cataudella and D. Ninno, Mobility of Biplasmapolarons and high T_c supercon-ductivity, Il Nuovo Cimento D 15, 1035 (1993).

[4] G. Iadonisi, V. Cataudella and D. Ninno, M.L. Chiofalo, Polaron and bipolaron coexistence in high- T_c superconductivity, Phys. Lett. A 196, 359 (1995).

[5] M. L. Chiofalo, N. M. March and M. P. Tosi, Model of r-space Bosons-Fermion mixture and its relevance to high- T_c cuprates, Phys. Chem. Liq. 37, 547 (1999).

[6] M.L. Chiofalo, S. Conti and M.P.Tosi, Dielectric screening in charged Bose versus Fermi liquids, Mod. Phys. Lett. B 8, 1207-1221 (1994).

[7] S. Conti, M.L. Chiofalo and M.P.Tosi, Dielectric response of the degenerate plasma of charged bosons in static local-field approximations, J. Phys. Condensed Matter 6, 8975 (1994).

[8] M.L. Chiofalo, S. Conti, S. Stringari and M.P.Tosi, Upper bounds on plasmon dispersion in the degenerate boson plasma, J. Phys. Condensed Matter 7, L85 (1995).

[9] M.L. Chiofalo, S. Conti and M.P. Tosi, Sum-rules in charged bosons, J. Phys. Cond. Matter 8, L1921 (1996).

[10] M. Holland, D. Jin, M.L. Chiofalo and J. Cooper, Emergence of interaction effects in Bose--Einstein condensation, Phys. Rev. Lett. 78, 3801 (1997).

[11] A. Minguzzi, M.L. Chiofalo and M.P. Tosi, Accurate results on Bose--Einstein condensation in axially symmetric harmonic traps, Il Nuovo Cimento D 18, 1357 (1996).

- [12] M. L. Chiofalo, S. Conti, A. Minguzzi and M. P. Tosi, Thermodynamics of a trapped interacting Bose gas, *Balkan Phys. Lett.* 6, 1 (1998).
- [13] A. Minguzzi, M.L. Chiofalo and M.P. Tosi, Collective excitations of weakly coupled Bose condensates confined in harmonic traps, *Physica B* 223, 60 (1997).
- [14] A. Minguzzi, M.L. Chiofalo and M.P. Tosi, Generalized quantum hydrodynamics of a trapped dilute Bose gas, *Phys. Lett. A* 236, 237 (1997).
- [15] M. L. Chiofalo, A. Minguzzi and M. P. Tosi, Time-dependent linear response of an inhomogeneous Bose superfluid: microscopic theory and connection to current-density functional theory, *Physica B* 254, 188 (1998); *ibid.*, *Highlights INFM 1998-1999*.
- [16] M. L. Chiofalo and M. P. Tosi, Time-dependent density-functional theory for superfluids, *Europhys. Lett.* 53, 162 (2001).
- [17] M. L. Chiofalo, S. Succi and M. P. Tosi, Output coupling of Bose condensates from atomic tunnel arrays: a numerical study, *Phys. Lett. A* 260, 86 (1999).
- [18] M. L. Chiofalo and M. P. Tosi, Output from Bose condensates in tunnel arrays: the role of mean-field interactions and of transverse confinement, *Phys. Lett. A* 268, 406 (2000).
- [19] M. L. Chiofalo, M. Polini and M. P. Tosi, Collective excitations of a periodic Bose condensate in the Wannier representation, *Eur. Phys. J. D* 11, 371 (2000).
- [20] M. L. Chiofalo, S. Succi and M. P. Tosi, Probing the energy bands of a Bose-Einstein condensate in an optical lattice, *Phys. Rev. A* 63, 063613 (2001).
- [21] S. Burger, F. S. Cataliotti, C. Fort, F. Minardi, M. Inguscio, M. L. Chiofalo and M. P. Tosi, Superfluid and Dissipative Dynamics of a Bose-Einstein Condensate in a Periodic Optical Potential, *Phys. Rev. Lett.* 86, 4447 (2001).
- [22] M. L. Chiofalo, M. Polini and M. P. Tosi, Coherent transport, in a Bose-Einstein condensate inside an optical lattice, *Laser Phys.* 12, 50 (2002).
- [23] M. L. Chiofalo and M. P. Tosi, Coherent transport in a Bose-Einstein condensate inside an optical lattice, *J. Phys. B: At. Mol. Opt. Phys. (Topical Reviews)* 34, R1-R10 (2001).
- [24] M. L. Chiofalo and M. P. Tosi, Josephson-type oscillations of a driven Bose-Einstein condensate in an optical lattice, *Europhys. Lett.* 56, 326 (2001).
- [25] A. Minguzzi, P. Vignolo, M. L. Chiofalo and M. P. Tosi, Hydrodynamic Excitations in a Spin-Polarized Fermi Gas under Harmonic Confinement in One Dimension, *Phys. Rev. A*

64, 033605 (2001).

[26] A. Minguzzi, P. Vignolo, M. L. Chiofalo and M. P. Tosi, Collective excitations of a one-dimensional Fermi gas under harmonic confinement, *J. of Low Temp. Phys.* 126, 443 (2002).

[27] M. J. Holland, S.J.J.M.F. Kokkelmans, M. L. Chiofalo and R. Walser, Resonance superfluidity in a quantum degenerate Fermi gas, *Phys. Rev. Lett.* 87, 120406 (2001).

[28] M. L. Chiofalo, S. Succi and M. P. Tosi, Ground state of trapped interacting Bose-Einstein condensates by an explicit imaginary-time algorithm, *Phys. Rev. E* 62, 7438 (2000).

[29] M. M. Cerimele, M. L. Chiofalo and F. Pistella, Numerical solution of the stationary Gross-Pitaevskii equation: tests of a combined imaginary-time-marching technique with splitting, *Nonlinear Analysis* 47, 3345 (2001).

[30] M. M. Cerimele, M. L. Chiofalo, F. Pistella, S. Succi and M. P. Tosi, Numerical solution of the Gross-Pitaevskii equation using an explicit finite-difference scheme: An application to trapped Bose-Einstein condensates, *Phys. Rev. E* 62, 1382 (2000).

[31] M.L. Chiofalo, S.J.J.M.F. Kokkelmans, J. Milburn, and M. J. Holland, Signatures of resonance superfluidity in a quantum fermi gas, *Phys. Rev. Lett.* 88, 90402 (2002).

[32] S. J. J. M. F. Kokkelmans, J. N. Milstein, M. L. Chiofalo, R. Walser and M. J. Holland, Resonance superfluidity: Renormalization of resonance scattering theory, *Phys. Rev. A* 65, 053617 (2002).

[33] M. Cardenas, M. L. Chiofalo and M. P. Tosi, Matter-wave dynamics in optical lattices: decoherence of Josephson oscillations from the Gross-Pitaevskii equation, *Physica B* 322, 116 (2002).

[34] S. Burger, F. S. Cataliotti, C. Fort, F. Minardi, M. Inguscio, M. L. Chiofalo, and M. P. Tosi, Reply to the Comment by B. Wu and Q. Niu, *Phys. Rev. Lett.* 88, 88902 (2002).

[35] M. L. Chiofalo, Routes to chaos for driven Bose-Einstein condensates: from fast to slow crossing regimes, *Phys. Lett. A* 300, 470 (2002).

[36] P. Vignolo, M. L. Chiofalo, S. Succi, and M. P. Tosi, Explicit finite-difference direct simulation Monte Carlo method for transport phenomena in mixtures of Bose-Einstein condensates with thermal atoms, *J. of Comp. Phys.* 182, 368 (2002).

[37] S.J.J.M.F. Kokkelmans, M. Holland, R. Walser, and M.L. Chiofalo, "Resonance superfluidity in a quantum degenerate fermi gas", *Acta Physica Polonica A* 101, 387 (2002).

[38] S.J.J.M.F. Kokkelmans, J.N. Milstein, R. Walser M.J. Holland, and M.L. Chiofalo, "Resonance superfluidity in a lithium gas: Renormalization of resonance scattering theory", **Proceedings of the** Conference on Quantum Electronics and Laser Science-Tech. Digest Series 74, 168 (2002).

- [39] V. Cataudella, G. Iadonisi, D. Ninno, G. De Filippis, and M. L. Chiofalo, "Large polarons, bipolarons and boson-fermion model of superconductivity", *Nuovo Cimento della SIF D* 19, 1357 (1997).
- [40] M. M. Cerimele, M. L. Chiofalo and F. Pistella, From coherent to incoherent dynamical behaviour of quantum atomic gases in periodic potentials, *Applied Num. Math.* 49, 319 (2004).
- [41] F. G. Bassani, V. Cataudella, M. L. Chiofalo, G. De Filippis, G. Iadonisi, and C. A. Perrone, Electron gas with polaronic effects: beyond the mean-field theory, *Phys. Status Solidi B* 237, 173 (2003).
- [42] M. L. Chiofalo, M. Artoni and G. C. La Rocca, Atom resonant tunneling through a moving barrier, *New J. Phys.* 5, 78 (2003). (Invited paper on the Quantum Gases Focus Issue).
- [43] A. M. Nobili, D. Bramanti, G. L. Comandi, R. Toncelli, E. Polacco, and M. L. Chiofalo, GALILEO GALILEI-GG: design, requirements, error budget and significance of the ground prototype, *Phys. Lett. A*.318, 172 (2003).
- [44] G. L. Comandi, A. M. Nobili, D. Bramanti, R. Toncelli, E. Polacco, and M. L. Chiofalo, GALILEO GALILEI (GG) on the Ground-GGG: experimental results and perspectives, *Phys. Lett. A*.318, 213 (2003).
- [45] G. L. Comandi, A. M. Nobili, R. Toncelli, and M. L. Chiofalo, Tidal effects in space experiments to test the equivalence principle: implications on the experiment design, *Phys. Lett. A*.318, 251 (2003).
- [46] Jelena Stajic, J. N. Milstein, Qijin Chen, M. L. Chiofalo, M. J. Holland, and K. Levin, The Nature of Superfluidity in Ultracold Trapped Fermi Gases Near Feshbach Resonances, *Phys. Rev. A* 69, 063610 (2004).
- [47] M. Artoni, M. L. Chiofalo, and G. C. La Rocca, Inelastic time-dependent tunneling of matter waves, *J. of Modern Optics* 51 1083 (2004).
- [48] S. De Palo, M. L. Chiofalo, M. J. Holland, and S. Kokkelmans, Resonance effects on the crossover of bosonic to fermionic superfluidity, *Phys. Lett. A* 327, 490 (2004).
- [49] D. Embriaco, M. L. Chiofalo, M. Artoni, and G. C. La Rocca, Effects of atomic interactions on the resonant tunneling of sodium condensates, *J. of Optics B: Quantum and Semicl. Optics* 7, S59 (2005).
- [50] S. De Palo, M. L. Chiofalo, M. J. Holland, and S. Kokkelmans, Superfluidity of an atomic Fermi gas near the unitarity limit, *Las. Phys.* 15, 376 (2005).
- [51] G. L. Comandi, M. L. Chiofalo, R. Toncelli, D. Bramanti, E. Polacco, and A. M. Nobili, Dynamical response of the Galileo Galilei rotor for a Ground test of the Equivalence Principle: theory, simulation and experiment. Part I: the normal modes, *Rev. Sci.Inst.*, 77, 034501--1-15 (2006).
- [52] G. L. Comandi, R. Toncelli, M. L. Chiofalo, D. Bramanti, and A. M. Nobili, Dynamical response of the Galileo Galilei rotor for a Ground test of the Equivalence Principle: theory,

simulation and experiment. Part II: the rejection behaviour , *Rev. Sci.Inst.*, 77, 034502--1-10, (2006).

[53] M. L. Chiofalo, S. Giorgini, and M. Holland, Released Momentum Distribution of a Fermi Gas in the BCS-BEC Crossover, *Phys. Rev. Lett.* 97, 070404 (2006).

[54] R. Citro, E. Orignac, S. de Palo, and M. L. Chiofalo, Evidence of Luttinger liquid behavior in one-dimensional dipolar quantum gases, *Phys. Rev. A Rapid Comm.* 75, 51602 (2007).

[55] V. Ivanov, A. Alberti, M. Schioppo, G. Ferrari, M. Artoni, M. L. Chiofalo and G. Tino, Coherent delocalization of atomic wavepackets in driven lattice potentials, *Phys. Rev. Letters* 100, 43601 (2008).

[56] P. Pedri, S. de Palo, R. Citro, E. Orignac and M. L. Chiofalo, Collective excitations of trapped dipolar quantum gases, *Phys. Rev. A Brief Reports* 77, 015601 (2008).

[57] R. Citro, S. de Palo, E. Orignac, P. Pedri and M. L. Chiofalo, Luttinger hydrodynamics of confined one-dimensional Bose gases with dipolar interactions, *New Journal of Phys.*, Special Issue on Quantum Gases, 10/4, 04501 (2008).

[58] S. de Palo, R. Citro, E. Orignac, and M. L. Chiofalo, The low-energy excitation spectrum of one-dimensional dipolar quantum gases, *Phys. Rev. B.* 77, 212101 (2008).

[59] A. Alberti, G. Ferrari, V. V. Ivanov, M. L. Chiofalo, and G. M. Tino, Atomic wave packets in amplitude-modulated vertical optical lattices, *New J. Phys.* 12, 065037 (2010).

[60] B. M. Peden, D. Meiser, M. L. Chiofalo, and M. J. Holland, Nondestructive cavity QED probe of Bloch oscillations in a gas of ultracold atoms, *Phys. Rev. A* 80, 043803 (2009).

[61] W. Ertmer et al. (MWXG collaboration), Matter wave explorer of gravity (MWXG), *Experimental Astronomy: An International Journal on Astronomical Instrumentation and Data Analysis*, 23, pp 611-650 (2009).

[62] R. Citro, S. De Palo, E. Orignac, P. Pedri, and M. L. Chiofalo, Probing 1D super-strongly correlated dipolar quantum gases, *Laser Physics* 4, 19, 554 (2009).

[63] M. Tarallo, A. Alberti, N. Poli, M. Chiofalo, F. Y. Wang, G.M. Tino, Delocalization-enhanced Bloch oscillations and driven resonant tunneling in optical lattices for precision force measurements, *Phys. Rev. A* 86, 33615 (2012).

[64] E. Orignac, R. Citro, S. De Palo, M. Chiofalo, Light scattering in inhomogeneous Tomonaga-Luttinger liquids, *Phys. Rev. A*, 85, 3634 (2012).

[65] M. Di Dio, R. Citro, S. De Palo, E. Orignac, M. L. Chiofalo, Meissner to vortex phase transition in a two-leg ladder in artificial gauge field, *The Eur. Phys. J.-SPECIAL TOPICS* 224, 525 (2015).

[66] M. Di Dio, S. De Palo, E. Orignac, R. Citro, M. L. Chiofalo, Persisting Meissner state and incommensurate phases of hard-core boson ladders in a flux, *Phys. Rev. B* 92, 506 (2015).

[67] E. Orignac, R. Citro, M. Di Dio, S. De Palo, M. L. Chiofalo, Incommensurate phases of

a bosonic two-leg ladder under a flux, *New. J. of Phys.* **18**, 55017 (2016).

[68] S. Musolino and M. L. Chiofalo, Correlation Length and Universality in the BCS-BEC Crossover for Energy-Dependent Resonance Superfluidity, *The Eur. Phys. J.-SPECIAL TOPICS* **226**, 2793 (2017).

[69] E. Colella, R. Citro, M. Barsanti, D. Rossini, and M. L. Chiofalo, Quantum Phases of Spinful Fermi Gases in Optical Cavities, *Phys. Rev. B* **97**, 134502 (2018).

[70] E. Colella, M. L. Chiofalo, M. Barsanti, D. Rossini, and R. Citro, Fluid structure of 1D spinful Fermi gases with long-range interactions, *Journal of Physics B: At.Mol. Opt. Phys.*, <https://dx.doi.org/10.1088/1361-6455/ab410f>

[71] D. Giambastiani, M. Barsanti, and M. L. Chiofalo, Interaction-Range Effects and Universality in the BCS-BEC Crossover of Spin-Orbit Coupled Fermi Gases, *Eur. Phys. Lett.* **123**, 66001 (2018).

[72] P. M. Bonetti and M. L. Chiofalo, Local-Field Theory of the BCS-BEC Crossover, submitted arXiv:1908.10648 (2019).

[73] P. M. Bonetti, A. Rucci, M. L. Chiofalo and V. Vuletic, Quantum Effects in the Aubry Transition, **in preparation**.

[74] C. Baroni, G. Gori, M. L. Chiofalo, and A. Trombettoni, Effect of interwell interactions on non-linear beam splitters for matter-wave interferometers, *Condensed Matter, in Special issue on Super Fluctuations 2019* (2020), <http://arxiv.org/abs/2004.11181>
https://www.mdpi.com/journal/condensedmatter/special_issues/SuperFluctuations_2019.

[75] L. Lucchesi and M.L. Chiofalo, Many-body Entanglement of Fermi Gases with Short-Range Interactions, *Phys. Rev. Lett.* **123**, 60406 (2019).

[76] L. Lepori, L. Lucchesi and M.L. Chiofalo, Quantum-Fisher Information scaling of Fermi Gases with Short-Range Interactions, **in preparation**.

[77] D. Giambastiani, M. Barsanti, and M. L. Chiofalo, On the superfluid and pseudo-gap structure of Fermi Gases with Spin-Orbit Coupling, **in preparation**.

[78] G. M. Tino, A. Bassi, G. Bianco, K. Bongs, P. Bouyer, L. Cacciapuoti, S. Capozziello, X. Chen, M. L. Chiofalo, A. Derevianko, W. Ertmer, N. Gaaloul, P. Gill, P. W. Graham, J. M. Hogan, L. Iess, M. A. Kasevich, H. Katori, C. Klempt, X. Lu, L.-S. Ma, H. Müller, N. R. Newbury, C. Oates, A. Peters, N. Poli, E. Rasel, G. Rosi, A. Roura, C. Salomon, S. Schiller, W. Schleich, D. Schlippert, F. Schreck, C. Schubert, F. Sorrentino, U. Sterr, J. W. Thomsen, G. Vallone, F. Vetrano, P. Villoresi, W. von Klitzing, D. Wilkowski, P. Wolf, J. Ye, N. Yu, M. S. Zhan, **SAGE: A Proposal for a Space Atomic Gravity Explorer**, *Eur. Phys. J. D* **73**, 228 (2019).

[79] Andrea Bertoldi, Kai Bongs, Philippe Bouyer, Oliver Buchmueller, Benjamin Canuel, Laurentiu-loan Caramete, Maria Luisa Chiofalo, Jonathon Coleman, Albert De Roeck, John Ellis, Peter W. Graham, Martin G. Haehnel, Aurelien Hees, Jason Hogan, Wolf von Klitzing, Markus Krutzik, Marek Lewicki, Chris McCabe, Achim Peters, Ernst Rasel, Albert Roura, D. O. Sabulsky, Stephan Schiller, Christian Schubert, Carla Signorini, Fiodor Sorrentino, Yajpal Singh, Guglielmo Tino, Ville Vaskonen, Ming-Sheng Zhan, **AEDGE: Atomic Experiment for Dark Matter and Gravity Exploration in Space**, *EPJ Quantum Technology* **7**, 6 (2020), <https://doi.org/10.1140/epjqt/s40507-020-0080-0>,

<https://epiquantumtechnology.springeropen.com/articles/10.1140/epigt/s40507-020-0080-0>, (2020), submitted to ESA call Voyage 2050 arXiv:1908.00802. Selected to be presented at the Voyage 2050 workshop *Shaping the European Space Agency's space science plan for 2035-2050*, 29 – 31 October 2019, Madrid, Spain.

[80] A. Shankar, L. Salvi, M. L. Chiofalo, N. Poli, and M.J. Holland, Squeezed state metrology with Bragg interferometers operating in a cavity, *Quantum Science and Technology*, <https://doi.org/10.1088/2058-9565/ab455d> (2019).

[81] A. Venegas-Gomez, J. Schachenmayer, A. S. Buyskikh, W. Ketterle, M. L. Chiofalo, and A. J. Daley, Adiabatic preparation of entangled, magnetically ordered states with cold bosons in optical lattices, <https://arxiv.org/abs/2003.10905> (2020).