

# CURRICULUM VITAE



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## Current research projects

Nanofriction: bridging the gap to the nano to the macro scale.

Calculations of the vibrational spectra of triatomic and 4-atomic molecules, within an algebraic model based on anharmonic Morse coordinates.

Collective dynamics (e.g. oscillations in a trap or free expansion) of droplets of ultra-cold interacting fermionic and bosonic atoms.

Ab-initio calculation of the optical properties of metals.

Ab-initio calculation of several structural, mechanical, and spectroscopical properties of 1D carbon-only chains (carbynes).

Polarizability and phase transitions in ionic liquids droplets.

## Research activity

2001-: assistant professor (researcher) at Milan University. Mesophases of ionic liquids films. Lubricated nanofriction: soliton-related velocity quantization phenomena in models for hard lubricants; molecular shape effects on the friction of soft lubricants. Ab-initio self-energy corrections in metals. Interacting Fermion gas: crossover from the BCS to the BEC limits. Anharmonic vibrational spectra of polyatomic molecules. Photoemission from heavy-fermion metals, within the Kondo lattice model away from half filling, in DMFT-NRG. Phonon shakeups in photoemission from molecular  $C_{60}$ , with full account of vibronic interaction in the final  $C_{60}^+$  states. Ab-initio calculations of structure and spectra of fullerenes.

Jahn-Teller effect and vibronic couplings in icosahedral systems. Electron-electron screened Coulomb couplings in the degenerate shell of positive  $C_{60}$  ions.

2000-2001: I.N.F.M. researcher at SISSA - Trieste, in E. Tosatti's group. Insulating and superconducting states of alkali-doped  $C_{60}$  materials, in particular  $NH_3 K_3 C_{60}$ . Dynamical Mean Field Theory in the Exact Diagonalization, and Numerical Renormalization Group flavors. Electron-phonon couplings in positive  $C_{60}$  ions.

1995-2000: research scientist at E.S.R.F. - Grenoble, in M. Altarelli's group. The new concept of off-diagonal geometric phases, extending the traditional Berry phase (collaboration with F. Pistolesi). Ground-state symmetry of positive fullerene ions, related to the presence or absence of a geometric phase. Many-modes dynamical Jahn-Teller: an exact solution for many vibrational modes strongly coupled to one degenerate electronic state. Magnetic circular dichroism in X-ray absorption spectroscopy of metal Ni within a small cluster model treatable with exact diagonalization.

1992-1995: PhD at SISSA - Trieste, in E. Tosatti's group. Electron-phonon interaction in fullerene ionic materials. Properties of the dynamical Jahn-Teller ions, role of a geometric phase, related to different experimental features such as: (i) anomalous attachment of thermal electrons to fullerene; (ii) characteristic splittings in the vibronic spectrum; (iii) reduction of the magnetic g-factor of fullerene anions; (iv) solid-state phenomena, including superconductivity.

1992-1992: 6 months' research fellowship at Yale University, USA. Applications of algebraic models to molecules with 4 or more atoms.

1986-1991: study of Physics - Trento University. Diploma Thesis on molecular spectroscopy. Theory: Extension of anharmonic algebraic models to four-atomic vibrational spectra ( $HCNO$  and  $H_2O_2$ ) (continued software maintenance and upgrade, <http://alpha.science.unitn.it/~oss/vibr3at.html>). Experiment: Measurements of vibrational overtones of hydrogen peroxide in cell and in supersonic beam.

## Education

1995, Oct. 27 - PhD in Condensed Matter Theory at SISSA - Trieste - Italy *cum summa laude*. Supervisor: E. Tosatti. External referee: D. Baeriswyl. Thesis: *Electron - Vibron Coupling in Charged Fullerene, Berry Phase, and Superconductivity*, <http://www.sissa.it/cm/thesis/1995/manini.ps.gz>.

1993, Oct. 15 - Magister Philosophiae Degree in Condensed Matter Theory, at SISSA - Trieste - Italy. Thesis title: *Electron - Vibron Interaction, Berry Phase and Superconductivity in Charged Fullerene*. Supervisor: E. Tosatti.

1992 - Scholarship from Italian Ministry of University and Research for attending a six-month-long specialization course in algebraic techniques, and research with F. Iachello at Yale University - New Haven CT - USA.

1991, Sep. 19 - Degree in Physics at Università degli Studi di Trento - Italy, with full marks and honor *110/110 cum laude*. Thesis title: *Vibrational Spectroscopy of Four-atomic Molecules*. Supervisors: F. Iachello (Yale University), S. Oss and M. Scotoni (Trento University).

## Teaching experience

### Supervised graduations (Milan University):

#### PhD:

A. Bordoni - <http://www.mi.infm.it/manini/theses/BordoniPhD.pdf>

#### 4/5-years (magister) diploma:

I. Castelli - <http://www.mi.infm.it/manini/theses/castelliMag.pdf>

C. Negri - <http://www.mi.infm.it/manini/theses/negriMag.pdf>

M. Cesaratto - <http://www.mi.infm.it/manini/theses/cesarattoMag.pdf>

F. Bonelli - <http://www.mi.infm.it/manini/theses/bonelliMag.pdf>

A. Miglio - <http://www.mi.infm.it/manini/theses/miglio.pdf>

M. Cazzaniga - <http://www.mi.infm.it/manini/theses/cazzaniga.pdf>

P. Gattari - <http://www.mi.infm.it/manini/theses/gattari.pdf>

A. Del Monte - [http://www.mi.infm.it/manini/theses/del\\_monte.pdf](http://www.mi.infm.it/manini/theses/del_monte.pdf)

A. Bordoni - <http://www.mi.infm.it/manini/theses/bordoni.pdf>

#### 3-years laurea degree:

R. Meloni - <http://www.mi.infm.it/manini/theses/meloni.pdf>

M. Zecchin - <http://www.mi.infm.it/manini/theses/zecchin.pdf>

F. Brivio - <http://www.mi.infm.it/manini/theses/brivio.pdf>

P. Ponzellini - <http://www.mi.infm.it/manini/theses/ponzellini.pdf>

G. Pagano - <http://www.mi.infm.it/manini/theses/pagano.pdf>

A. Paroni - <http://www.mi.infm.it/manini/theses/paroni.pdf>

E. Diato - <http://www.mi.infm.it/manini/theses/diato.pdf>

N. Ferri - <http://www.mi.infm.it/manini/theses/ferri.pdf>

N.S. Falzoi - <http://www.mi.infm.it/manini/theses/falzoi.pdf>

B. Van Hattem - [http://www.mi.infm.it/manini/theses/van\\_hattem.pdf](http://www.mi.infm.it/manini/theses/van_hattem.pdf)

E. Distante - <http://www.mi.infm.it/manini/theses/distante.pdf>

C. Negri - <http://www.mi.infm.it/manini/theses/negri.pdf>

I.E. Castelli - <http://www.mi.infm.it/manini/theses/castelli.pdf>

F. Caruso - <http://www.mi.infm.it/manini/theses/caruso.pdf>

M. Cesaratto - <http://www.mi.infm.it/manini/theses/cesaratto.pdf>

M. Korbman - <http://www.mi.infm.it/manini/theses/korbman.pdf>

F. Bonelli - <http://www.mi.infm.it/manini/theses/bonelli.pdf>

A. Bugada - <http://www.mi.infm.it/manini/theses/bugada.pdf>

G. Diana - <http://www.mi.infm.it/manini/theses/diana.pdf>

E. Cinquanta - <http://www.mi.infm.it/manini/theses/cinquanta.pdf>

G. Divitini - <http://www.mi.infm.it/manini/theses/divitini.pdf>

G. La Spada - [http://www.mi.infm.it/manini/theses/la\\_spada.pdf](http://www.mi.infm.it/manini/theses/la_spada.pdf)

F. Dalla Piazza - [http://www.mi.infm.it/manini/theses/dalla\\_piazza.pdf](http://www.mi.infm.it/manini/theses/dalla_piazza.pdf)

## Courses Taught:

2010-: course *Surface Physics 1 (Fisica delle Superfici 1, 48 hours/year)* - Magister diploma in Physics - Milan University.

2008-: course *Physical methods applied to biotechnology, (Metodi fisici applicati alle biotecnologie, 24 hours/year)* - Magister diploma in biotechnology - Milan University. Lecture slides and topics summary at [http://www.mi.infm.it/manini/dida/Metodi\\_Fisici\\_Biotecnologie.html](http://www.mi.infm.it/manini/dida/Metodi_Fisici_Biotecnologie.html).

2003-: topic course *Quantum Theory of Matter* for the PhD programme - Milan University (10 hours/year).

2003-2009: course *Structure of Matter 1 (Struttura della Materia 1, 60 hours/year)* 3-years laurea degree in Physics - Milan University. Lecture notes and exercises at [http://www.mi.infm.it/manini/dida/Struttura\\_della\\_Materia\\_1.html](http://www.mi.infm.it/manini/dida/Struttura_della_Materia_1.html).

2001-2003: practicals for *Structure of Matter (Struttura della Materia, 30 hours/year)* - 4-years Magister diploma in Physics - Milan University.

2002-2009: appointed teacher of *Vibronic effects in molecules and molecular solids* at SISSA, Trieste

1994, 1995, 2000: trainer of the Italian Physics Olympiads Team.

1991-1992: math and physics course for a *Liceum* (students of age 13 to 19) in Trento (16 weeks - 18 hours/week).

## Administrative experience

2001-: participation to several funded projects (Italian COFIN, FIRB; European Union NoE).

2008: member of the committee for the selection of the E.T.S.F. director.

2007- : member of the Teachers executive committee (Giunta) for the Physics Diploma at Milan University.

2006-2008: member of the Science Faculty executive committee (Giunta) of Milan University.

2003- : Member (until 2007: Scientific Secretary) of the Council of teachers of the Physics PhD programme of Milan University.

2000-2001: administrative tasks within the SISSA I.N.F.M. research unit.

1998- : Referee service for Chem. Phys. Lett., Eur. Phys. J. B, Europhys Lett., J. Mol. Struct., J. Phys. B, J. Phys. Chem. Solids, Phys. Lett. A, Phys. Rev. A + B + E + Lett., Tribol. Lett., and Rep. Math. Phys. 1999-2000: initial developer and administrator of <http://www.esrf.eu/UsersAndScience/Experiments/CMTheory> (E.S.R.F. theory group).

1994-1995: initial developer and administrator of <http://www.sissa.it/cm/> (SISSA condensed matter theory group).

## Conference organization

2008-2009: co-organizer of the *Joint ICTP/FANAS Conference on Trends in Nanotri-*

*bology*, Trieste, Oct. 19-24, 2009 [http://cdsagenda5.ictp.it/full\\_display.php?ida=a08185](http://cdsagenda5.ictp.it/full_display.php?ida=a08185) .

2005-2006: co-organizer of the *International Symposium on the Jahn-Teller Effects: Novel Aspects in Orbital Physics and Vibronic Dynamics of Molecules and Crystals*, Trieste, Aug. 28-31, 2006 [http://cdsagenda5.ictp.trieste.it/full\\_display.php?ida=a05220](http://cdsagenda5.ictp.trieste.it/full_display.php?ida=a05220) and editor of the proceedings volume 838 of *J. Mol. Struct.* <http://www.sciencedirect.com/science/issue/5262-2007-991619998-659403> .

2003-2004: co-organizer of the Mini-Colloquium *Theory of Optical and Dielectric Properties of Condensed Matter* at the 20th General Conference Condensed Matter Division European Physical Society, Prague, July 19-23, 2004.

2003-2004: co-organizer of the *Fullerene - Solid State Symposium at 205rd Meeting of The Electrochemical Society*, San Antonio, TX, USA, May 9-13, 2004.

## Languages

Italian: Mother tongue; English: Excellent; French: Good.

## Computing

Environments: unix (linux, aix, hp-ux...), MS-dos/windows, Mac OS, vms.

Programming: c++, Mathematica, perl, python, fortran, unix shell/sed/awk, html, use of standard libraries and parallel-computer environments.

Editors/utilities: emacs, latex, xmgrace, gimp, xfig, MS/open office...

## Publications in peer-reviewed journals

60. *Synthesis, Characterization and Modelling of Naphthyl-terminated sp-Carbon Chains: Dinaphthylpolyynes*, F. Cataldo, L. Ravagnan, E. Cinquanta, I. Castelli, N. Manini, G. Onida, and P. Milani, submitted to *The Journal of Physical Chemistry*

59. *Dependence of boundary lubrication on the misfit angle between the sliding surfaces*, O.M. Braun and N. Manini, submitted to *Phys. Rev. E*.

58. *Ab initio intraband contributions to the optical properties of metals*, M. Cazzaniga, L. Caramella, N. Manini, and G. Onida, *Phys. Rev. B* **82**, 035104 (2010).

57. *Vibrational properties of sp carbon atomic wires in cluster-deposited carbon films*, G. Onida, N. Manini, L. Ravagnan, E. Cinquanta, D. Sangalli, and P. Milani, *Phys. Status Solidi B* **247**, 2017 (2010).

56. *Comment to 'Imaging the atomic orbitals of carbon atomic chains with field-emission electron microscopy'*, N. Manini and G. Onida, *Phys. Rev. B* **81**, 127401 (2010).

55. *AFM dissipation topography and hysteretic phenomena at adsorbed overlayers*, C. Negri, N. Manini, A. Vanossi, G.E. Santoro, and E. Tosatti, *Phys. Rev. B* **81**, 045417 (2010).

54. *Mesophases in nearly-2D room-temperature ionic liquids*, N. Manini, M. Cesaratto, M. G. Del Popolo, and P. Ballone, *J. Phys. Chem. B* **113**, 15602 (2009).

53. *Tribology of the lubricant quantized-sliding state*, I. E. Castelli, R. Capozza, A. Vanossi, G.E. Santoro, N. Manini, and E. Tosatti, *J. Chem. Phys.* **131**, 174711 (2009).
52. *Atomistic simulations of the sliding friction of graphene flakes*, F. Bonelli, N. Manini, E. Cadelano, and L. Colombo, *Eur. Phys. J. B* **70**, 449 (2009).
51. *Effect of Axial Torsion on sp Carbon Atomic Wires*, L. Ravagnan, N. Manini, E. Cinquanta, G. Onida, D. Sangalli, C. Motta, M. Devetta, A. Bordoni, P. Piseri, and P. Milani, *Phys. Rev. Lett.* **102**, 245502 (2009); selected for Volume 19 Issue 26 of *Virtual Journal of Nanoscale Science & Technology*.
50. *Algebraic-matrix calculation of vibrational levels of triatomic molecules*, T. Sedivcova, Hewa Y. Abdullah, and N. Manini, *J. Phys. Chem. A* **113**, 6142 (2009).
49. *DC and AC Josephson effects with superfluid Fermi atoms across a Feshbach resonance*, L. Salasnich, F. Ancilotto, N. Manini, and F. Toigo, *Laser Phys.* **19**, 636 (2009).
48. *The role of lubricant molecular shape in microscopic friction*, O. M. Braun, N. Manini, and E. Tosatti, *Phys. Rev. B* **78**, 195402 (2008).
47. *Role of transverse displacements for a quantized-velocity state of the lubricant*, I. E. Castelli, N. Manini, R. Capozza, A. Vanossi, G. E. Santoro, and E. Tosatti, *J. Phys.: Condens. Matter* **20**, 354005 (2008).
46. *Nonlinear hysteretic behavior of a confined sliding layer*, N. Manini, G.E. Santoro, E. Tosatti, and A. Vanossi, *J. Phys.: Condens. Matter* **20**, 224020 (2008).
45. *Lubricated friction between incommensurate substrates*, A. Vanossi, G. E. Santoro, N. Manini, E. Tosatti, and O. M. Braun, *Tribol. Int.* **41**, 920 (2008).
44. *Macroscopic periodic tunneling of Fermi atoms in the BCS-BEC crossover*, L. Salasnich, N. Manini and F. Toigo, *Phys. Rev. A* **77**, 043609 (2008).
43. *Ab initio self-energy corrections in systems with metallic screening*, M. Cazzaniga, N. Manini, L. G. Molinari, and G. Onida, *Phys. Rev. B* **77**, 035117 (2008).
42. *An optimized algebraic basis for molecular potentials*, A. Bordoni and N. Manini, *J. Phys. Chem. A* **111**, 12564 (2007).
41. *Static friction on the fly: velocity depinning transitions of lubricants in motion*, A. Vanossi, N. Manini, F. Caruso, G.E. Santoro, and E. Tosatti, *Phys. Rev. Lett.* **99**, 206101 (2007); selected for Volume 16 Issue 22 of *Virtual Journal of Nanoscale Science & Technology*.
40. *Dynamic hysteresis of a confined lubricant under shear*, N. Manini, A. Vanossi, G.E. Santoro, and E. Tosatti, *Phys. Rev. E* **76**, 046603 (2007).
39. *Kink plateau dynamics in finite-size lubricant chains*, M. Cesaratto, N. Manini, A. Vanossi, E. Tosatti, and G. E. Santoro, *Surf. Sci.* **601**, 3682 (2007).
38. *Hysteresis from dynamically pinned sliding states*, A. Vanossi, G. E. Santoro, N. Manini, M. Cesaratto, and E. Tosatti, *Surf. Sci.* **601**, 3670 (2007).
37. *Solitons and exact velocity quantization of incommensurate sliders*, N. Manini, M. Cesaratto, G.E. Santoro, E. Tosatti, and A. Vanossi, *J. Phys.: Condens. Matter* **19**, 305016 (2007).
36. *Self-induced density modulations in the free expansion of Bose-Einstein condensates*, L. Salasnich, N. Manini, F. Bonelli, M. Korbman, and A. Parola, *Phys. Rev. A* **75**, 043616 (2007).
35. *Mean-Field vs. Monte Carlo Equation of State for the Expansion of a Fermi Superfluid in the BCS-BEC Crossover*, L. Salasnich and N. Manini, *Laser Phys.* **17**, 169 (2007).

34. *Systematic calculation of molecular vibrational spectra through a complete Morse expansion*, A. Bordoni and N. Manini, Int. J. Quantum Chem. **107**, 782 (2006).
33. *Exactly quantized dynamics of classical incommensurate sliders*, A. Vanossi, N. Manini, G. Divitini, G.E. Santoro, and E. Tosatti, Phys. Rev. Lett. **97**, 056101 (2006); selected for Volume 14 Issue 7 of Virtual Journal of Nanoscale Science & Technology.
32. *Asymmetric frictional sliding between incommensurate surfaces*, G. E. Santoro, A. Vanossi, N. Manini, G. Divitini, and E. Tosatti, Surf. Sci. **600**, 2726 (2006).
31. *Expansion of a Fermi Cloud in the BCS-BEC Crossover*, G. Diana, N. Manini, and L. Salasnich, Phys. Rev. A **73**, 065601 (2006).
30. *Enumeration of many-body skeleton diagrams*, L. G. Molinari and N. Manini, Eur. Phys. J. B **51**, 331 (2006).
29. *Condensate fraction of a Fermi gas in the BCS-BEC crossover*, L. Salasnich, N. Manini, and A. Parola, Phys. Rev. A **72**, 023621 (2005).
28. *Bulk and collective properties of a dilute Fermi gas in the BCS-BEC crossover*, N. Manini and L. Salasnich, Phys. Rev. A **71**, 033625 (2005).
27. *Low-energy excitations of a linearly Jahn-Teller coupled orbital quintet*, N. Manini, Phys. Rev. A **71**, 032503 (2005).
26. *Low-energy unphysical saddle in polynomial molecular potentials*, A. Del Monte, N. Manini, L.G. Molinari, and G.P. Brivio, Mol. Phys. **103**, 689 (2005).
25. *Jahn-Teller Spectral Fingerprint in Molecular Photoemission:  $C_{60}$* , N. Manini, P. Gattari, and E. Tosatti, Phys. Rev. Lett. **91**, 196402 (2003); selected for Volume 8 Issue 20 of Virtual Journal of Nanoscale Science & Technology.
24. *Hund's rule Magnetism in  $C_{60}$  ions?*, M. Lueders, N. Manini, P. Gattari, and E. Tosatti, Eur. Phys. J. B **35**, 57 (2003).
23. *Comment to 'Experimental Evidence of a Dynamic Jahn-Teller Effect in  $C_{60}^+$ '*, N. Manini and E. Tosatti, Phys. Rev. Lett. **90**, 249601 (2003).
22. *Coulomb couplings in positively charged fullerene*, M. Lueders, A. Bordoni, N. Manini, A. Dal Corso, M. Fabrizio, and E. Tosatti, Philos. Mag. B **82**, 1611 (2002).
21. *Sensitivity of the Mott transition to noncubic splitting of the orbital degeneracy: Application to  $NH_3 K_3 C_{60}$* , N. Manini, G.E. Santoro, A. Dal Corso, and E. Tosatti, Phys. Rev. B **66**, 115107 (2002).
20. *Observation of off-diagonal geometric phase in polarized neutron interferometer experiments*, Y. Hasegawa, R. Loidl, G. Badurek, M. Baron, N. Manini, F. Pistolesi, and H. Rauch, Phys. Rev. A **65**, 052111 (2002).
19. *Low-Energy Scales and Temperature-Dependent Photoemission of Heavy Fermions*, T.A. Costi and N. Manini, J. Low Temp. Phys. **126**, 835 (2002).
18. *Electron-vibration coupling constants in positively charged fullerene*, N. Manini, A. Dal Corso, M. Fabrizio, and E. Tosatti, Philos. Mag. B **81**, 793 (2001).
17. *Off-Diagonal Geometric Phases*, N. Manini and F. Pistolesi, Phys. Rev. Lett. **85**, 3067 (2000).
16. *Geometric Phases and Multiple Degeneracies in Harmonic Resonators*, F. Pistolesi and N. Manini, Phys. Rev. Lett. **85**, 1585 (2000).
15. *Berry phase and ground-state symmetry in  $H \otimes h$  dynamical Jahn-Teller systems*, N.

Manini and P. De Los Rios, Phys. Rev. B **62**, 29 (2000).

14. *The role of the Berry Phase in Dynamical Jahn-Teller Systems*, N. Manini and P. De Los Rios, J. Phys.: Condens. Matter **10**, 8485 (1998).

13. *Exact zero-point energy shift in the  $e \otimes (n E)$ ,  $t \otimes (n H)$  many modes dynamic Jahn-Teller systems at strong coupling*, N. Manini and E. Tosatti, Phys. Rev. B **58**, 782 (1998).

12. *Comment on 'Spin Polarization and Magnetic Circular Dichroism in Photoemission from the 2p Core Level of Ferromagnetic Ni'*, N. Manini, M. van Veenendaal, and M. Altarelli, Phys. Rev. Lett. **79**, 2594 (1997).

11. *Surprises in the Orbital Magnetic Moment and g-Factor of the Dynamic Jahn-Teller Ion  $C_{60}^-$* , E. Tosatti, N. Manini, and O. Gunnarsson, Phys. Rev. B **54**, 17184 (1996).

10. *Dynamical Jahn-Teller effect and Berry phase in positively charged fullerenes: Basic considerations*, P. De Los Rios, N. Manini, and E. Tosatti, Phys. Rev. B **54**, 7157 (1996).

9. *Phase Diagram of a Model of Correlated Electrons in a Lattice of Berry Molecules*, G. Santoro, N. Manini, A. Parola, and E. Tosatti, Phys. Rev. B **53**, 828 (1996).

8. *Phase Diagram of Correlated Electrons in a Lattice of Berry Phase Molecules*, G. Santoro, M. Airoidi, N. Manini, E. Tosatti, and A. Parola, Phys. Rev. Lett. **74**, 4039 (1995).

7. *Enhanced Electron Pairing in a Lattice of Berry Phase Molecules*, N. Manini, E. Tosatti, and S. Doniach, Phys. Rev. B **51**, 3731 (1995).

6. *A simple approach to correlation of rotovibrational levels of four-atomic molecules*, N. Manini and S. Oss, Z. Phys. D **32**, 85 (1994).

5. *Anomalous attachment of low-energy electrons to  $C_{60}$* , E. Tosatti and N. Manini, Chem. Phys. Lett. **223**, 61 (1994).

4. *Electron-vibron interactions in charged fullerenes. II. Pair energies and spectra*, N. Manini, E. Tosatti, and A. Auerbach, Phys. Rev. B **49**, 13008 (1994).

3. *Electron-vibron interactions in charged fullerenes. I. Berry phases*, A. Auerbach, N. Manini, and E. Tosatti, Phys. Rev. B **49**, 12998 (1994).

2. *VIBR3AT: a computer program for triatomic molecular spectroscopy in an algebraic approach*, S. Oss, N. Manini, and R. Lemus Casillas, Comp. Phys. Comm. **74**, 164 (1993).

1. *Quasi-linear four-atomic molecules in the vibron model*, F. Iachello, N. Manini, and S. Oss, J. Mol. Spectrosc. **156**, 190 (1992).

## Scientific books and book chapters

2. *Theoretical aspects of highly correlated fullerenes: metal-insulator transition*, N. Manini and E. Tosatti, *Fullerene-Related Materials*, ed. S. Margadonna (Springer 2008) ISBN: 978-1402044588, Chap. 6; cond-mat/0602134.

1. *Introduction to the Physics of Matter*, N. Manini (CUSL Milano, 2009) ISBN: 88-8132-576-4.

## Conferences, workshops, and publications in proceedings

NM delivered a total of 15 invited talks, plus several contributed talks and posters at the

following international conferences:

CECAM workshop on Quantum Monte Carlo for atoms, molecules and selected condensed matter systems, Orsay (Paris), France, June 12-20, 1990

*Roto-vibrational spectroscopy of quadriatomic molecules: an algebraic approach*,  
S. Oss, N. Manini, and L. Viola

published in

Proceedings of SASP 92 - Symposium on Atomic and Surface Physics (Pampeago, Italy, Jan. 19-25, 1992) p. 2.120. edited by D.Bassi, M.Scotoni and P.Tosi

XII Congresso Fisica Teorica e Struttura della Materia, Fai della Paganella (Trento), Italy, March 31 - April 3, 1993

*Electron-vibron interactions and Berry phases in Charged Fullerene*,  
presented at

1994 March Meeting of the American Physical Society, Pittsburgh, PA, U.S.A., March 21-25, 1994

*Berry phases and Superconductivity in ionic  $C_{60}$ -based materials*,  
poster presented at

Congresso nazionale di fisica della materia, Brescia, Italy, June 13-16, 1994

*Electron-Vibron Interaction and Berry Phases in Charged Fullerene*, and *Enhanced Electron Pairing in a Lattice of Berry Phase Molecules*, posters presented at International Conference on Magnetic Correlations, Metal-Insulator-Transitions and Superconductivity in Novel Materials, Wuerzburg, Germany, Sept. 26-30, 1994

VII International Workshop on Computational Condensed Matter Physics: Total Energy and Force Methods, I.C.T.P., Trieste, Italy, Jan. 11-15, 1995

*Low lying excitations of the Dynamical Jahn-Teller ions  $C_{60}^-$  and  $C_{60}^{2-}$* , N. Manini  
and E. Tosatti

published in

Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials: Volume 2, edited by K.M. Kadish and R.S. Ruoff (The Electrochemical Society, Inc., Pennington, NJ, 1995), p. 1017.

invited talk at

187th Meeting of The Electrochemical Society, Inc., Reno, NV, U.S.A., May 21-26, 1995

Adriatico Research Conference - NATO Advanced Research Workshop on Physics of Sliding Friction, I.C.T.P., Trieste, Italy, June 20-23, 1995

*Surprises in the Orbital Magnetic Moment and g-Factor of the Dynamic Jahn-Teller Fullerene Ion*,

invited talk at

XV Congresso Fisica Teorica e Struttura della Materia, Fai della Paganella (Trento), Italy, March 30 - April 2, 1996

*Enhanced Electron Pairing in a Lattice of Berry Phase Molecules*,  
presented at

Euroconference on The role of Dimensionality in the Correlated Electronic Systems, Villa Gualino, Torino, Italy, May 6-25, 1996

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1997), p. 468.

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International Society of Electrochemistry, Paris, France, Aug. 31 - Sep. 5, 1997

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*Fullerene ions: many-modes dynamic Jahn-Teller systems at strong coupling*,

poster presented at  
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Proceedings of the *XIV International Symposium on Electron-Phonon Dynamics and Jahn-Teller Effect*, Erice-Italy 7-13 July 1998, edited by G. Bevilacqua, L. Martinelli, and N. Terzi  
(World Scientific Publishing Co. Pte. Ltd, Singapore, 1999), p. 37. (invited talk)

SRRTNET Workshop '99 Workshop on Theory and Computation for Synchrotron Radiation  
Frascati, Italy, Sep. 23-25, 1999

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*Which ground state for  $C_{60}^+$ ?*,

poster presented at  
XIV International Winterschool - Euroconference on Electronic properties of novel materials  
- molecular nanostructures, Kirchberg/Tirol Austria Mar. 4-11, 2000

*Electron-vibration couplings in positive  $C_{60}^+$  ions*,

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Kirchberg/Tirol Austria Mar. 3-10, 2001

*Electron-vibration couplings in positively charged fullerene*,

presented at  
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*Accoppiamenti elettrone-vibrazione in fullerene caricato positivamente,*  
invited talk at  
LXXXVII Congresso Nazionale Società Italiana di Fisica, Milano - Bicocca, Sep. 24-29, 2001

*Coulomb couplings in positively charged fullerene,*  
poster presented at  
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*Jahn-Teller Distortions and Excitation Energies in  $C_{60}^{n+}$ ,* M. Lueders and N.  
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*Sensitivity of the Mott transition to noncubic splitting of the orbital degeneracy: Applica-  
tion to  $NH_3 K_3 C_{60}$ ,*

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203rd Meeting of The Electrochemical Society, Paris, France, Apr. 27 - May 2, 2003

*Hund Rule Magnetism in  $C_{60}$  Ions and Calculation of the Photoemission Spectrum of Gas-  
Phase  $C_{60}$ ,* posters presented at INFMeeting - National Conference on Physics of Matter,  
Genova, Italy, June 23-25, 2003

*Sensitivity of the Mott transition to noncubic splitting of the orbital degeneracy: Applica-  
tion to  $NH_3 K_3 C_{60}$ ,*

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*Hund's Rule Magnetism in  $C_{60}$  Ions?*,  
poster presented at  
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Workshop on Novel States and Phase Transitions in Highly Correlated Matter, I.C.T.P., Trieste, Italy, July 12-23, 2004

20th General Conference Condensed Matter Division EPS, Prague, Czech Republic, July 19-23, 2004

*Jahn-Teller Spectral Fingerprint in Molecular Photoemission:  $C_{60}$* ,  
invited talk at  
International workshop on Jahn-Teller Effect, Beijing, China, Aug. 24-26, 2004

*Off-diagonal geometric phases*,  
invited talk at  
School and Workshop on Quantum Entanglement, Decoherence, Information, and Geometrical Phases in Complex Systems, I.C.T.P., Trieste, Italy Nov. 01-12, 2004

*Jahn-Teller Spectral Fingerprint in Molecular Photoemission:  $C_{60}$* ,  
invited talk at  
XII International Workshop on Computational Condensed Matter Physics and Materials Science: Total Energy and Force Methods, I.C.T.P., Trieste, Italy, Jan. 13-15, 2005

*Many-body Properties of a Jellium Slab*,  
presented at  
40 Years of the GW Approximation for the Electronic Self-Energy: Achievements and Challenges, Bad Honnef, Germany, Sep. 12-15, 2005

*Condensate Fraction of a Fermi Gas in the BCS-BEC Crossover*,  
poster presented at  
Highlights in Physics 2005, Milano, Italy, Oct. 11-14, 2005

*Exact velocity quantization phenomena in the lubricated friction of classic periodic sliders*,  
presented at  
12th Workshop On Surface Dynamics, Modena, Italy, June 22-25, 2006

*Nanotribology and lubrication at the atomic scale*,  
invited talk at  
International School of Solid State Physics - 37th workshop: low-dimensional phenomena and simulations, Erice, Italy, July 26-31, 2006

*Linear Jahn-Teller effect of an orbital quintet in icosahedral symmetry*,  
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International Symposium on the Jahn-Teller Effects: Novel Aspects in Orbital Physics and Vibronic Dynamics of Molecules and Crystals, Trieste, Italy, Aug. 28-31, 2006.

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*Exactly quantized dynamics of classical incommensurate sliders*,  
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XCII Congresso nazionale - Società Italiana di Fisica, Torino, Italy, Sep. 18-23, 2006

*Static friction on the fly: velocity pinning transitions of lubricants in motion*,

poster presented at  
Statphys 23, Genova, Italy, July 9-13, 2007

*Static friction on the fly: velocity pinning transitions of lubricants in motion,*  
invited talk at

Vibrations at Surfaces 12, Erice, Italy, July 20-26, 2007

12th Nanoquanta Workshop on Electronic Excitations, Aussois, France, Sep. 18-22, 2007

*Quantized lubricant velocity in a bi-dimensional sliding model,*  
invited talk at

CECAM workshop: Modelling and simulations of friction at the nanoscale: from understanding to control, Lyon, France, Nov. 08-10, 2007

*The role of lubricant molecular shape in microscopic friction,*  
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International School of Solid State Physics - 44th workshop: Dynamical Phenomena in low-Dimensional Systems, Erice, Italy, July 20-26, 2008

*Hund's Rule Magnetism in C<sub>60</sub> Ions?*  
poster presented at

XIX International Symposium on the Jahn-Teller Effect: Vibronic Interactions and Orbital Physics in Molecules and in the Condensed Phase, Heidelberg, Germany, Aug. 25-29, 2008

13th Nanoquanta-ETSF Workshop on Electronic Excitations, Pugnochiuso, Italy, Sep. 22-27, 2008

*The role of lubricant molecular shape in microscopic friction,*  
presented at

Physics of Tribology - Understanding Friction and Wear processes in technical systems, Bad Honnef, Germany, March 22-25, 2009

*Computer simulation of 2D mesophases of 1,3-dialkylimidazolium ionic liquid films,*  
presented at

CECAM workshop: Computational models of room temperature ionic liquids, Dublin, Ireland, April 6-8, 2009

*Theory of AFM frictional dissipation at surface Moire patterns,*  
presented at

2nd South-East European Conference on Computational Mechanics (SEECCM 2009), Rhodes, Greece, June 22-24, 2009

*Theory of AFM frictional dissipation at surface Moire patterns,*  
presented at

ECOSS 26, European Conference on Surface Science, Parma, Italy, Aug. 30 - Sep. 04, 2009

Joint ICTP/FANAS Conference on Trends in Nanotribology Trieste, Oct. 19-24, 2009

*Tribology of the lubricant quantized sliding state,*  
invited talk at

ACAM- SFI SimBioMa-ESF Workshop: Molecular Friction Dublin, Ireland, Dec. 14-16, 2009

*Theory of AFM frictional dissipation at surface Moire patterns,*  
presented at

Transalp'Nano 2010, The Second Transalpine Conference on Nanoscience and Nanotechnologies Como, Italy, June 3 - 5, 2010.

NOTE: most of NM's publications (including preprints and obscure conference proceed-

ings) are available at [http://arXiv.org/find/cond-mat/1/au:+manini\\_n/0/1/0/all/0/1](http://arXiv.org/find/cond-mat/1/au:+manini_n/0/1/0/all/0/1)

## Scientific web publications

*Berry's geometric phase: a review*, N. Manini, <http://www.mi.infm.it/manini/berryphase.html>

*Off-diagonal geometric phases*, N. Manini, <http://www.mi.infm.it/manini/offdiagonal.html>

*Off-diagonal geometric phases*, F. Pistolesi and N. Manini, ILL Annual Report 2000, p. 76, [http://www.ill.eu/fileadmin/users\\_files/Annual\\_Report/AR-00/p-76.htm](http://www.ill.eu/fileadmin/users_files/Annual_Report/AR-00/p-76.htm)

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