Curriculum Vitae
Nicola Malossi

First Name : Nicola
Family Name: Malossi

[illegible]

Education and training:

PhD in Physical Science.
Data: 10/03/2008
Institution: Niels Bohr Institutet, Kobenhavns Universitet, Faculty of Natural Sciences Copenhagen University, Denmark
Title:
"Experimental studies of cold magnesium atoms in a magnetic-optical trap towards a novel frequency standard"
Supervisor: Prof. J.W.Thomsen

Master Degree in physical science.
Data: 28/03/2003
Institution: University of Pisa
Title:
"Effetti non lineari e tunneling asimmetrico per condensati di Bose Einstein in reticoli ottici"
"Nonlinear effects and asymmetric tunneling for Bose Einstein condensates in optical lattices"
Grade : 103/110
Supervisor: Prof. Ennio Arimondo

Bachelor degree in physical science
Data: 21/10/2002
Institution: University of Pisa
Title :
"From the Bose equation to the Gross-Pitaevski Equation"
Grade: 101/110
Supervisor: Prof. Ennio Arimondo

Qualifications:

Abilitazione al profilo di Ricercatore Terzo livello del Consiglio Nazionale delle Ricerche (CNR), bando 364.95, con provvedimento dirigenziale n.0066270 (19/09/2011)
(Qualification to the position of Researcher III Level of the National Research Council, CNR. Bando 364.95, with protocol n.0066270 19/09/2011)

JOBS

Position : Researcher RTD-A, University of Camerino
Starting from 01/04/2017 to 31/12/2020

Position: Researcher RTD-A, University of Camerino
Period from 01/10/2013 to 31/12/2016

Position: Researcher fellowship (Assegno di Ricerca), CNR-INO, University of Pisa
Period from 01/06/2013 to 30/09/2013

Position: Researcher fellowship (Assegno di Ricerca), University of Pisa
Period from 01/06/2012 to 31/05/2013.

Position: Researcher fellowship (CoCoPro) CNR-NAMEQUAM (European Network) (University of Pisa)
Pereiod from 15/08/2011 to 31/05/2012

Position: Researcher CNISM III lvl, Unità Cnism of the University of Pisa
Period from 01/07/2009 to 31/06/2011

Position: Researcher fellowship CNRS-Observatoire de Paris, SYRTE, Paris, France.
Period from 01/05/2008 to 30/06/2009

Position: Researcher assistant, Niels Bohr Institute, University of Copenhagen.
Period from 01/01/2008 to 30/04/2008

Position: PhD student
Period from 01/01/2004 to 01/01/2007

Position: Researcher assistant, CAUAC European Network Niels Bohr Institute, University of Copenhagen
Period from 01/10/2003 to 31/12/2003

Position: Post graduate position, Nano Cold European network, University of Pisa.
Period from 01/10/2003 to 31/12/2003

Field of Research:

Light and matter interactions, atomic physics, quantum optics, ultracold atoms. Bose-Einstein Condensation, Rydberg Atoms, cold atoms interferometry, metrology, quantum information, quantum simulations. Quantum optics, cavity opto-mechanics, electro-mechanics and opto-electro-mechanics, hybrid quantum system.

Skills:

Spectroscopy, frequency stabilization of lasers and optical cavities , laser cooling and trapping of neutral atoms, alkali and alkali-earth atoms, optical lattices, Bose-Einstein Condensation, ionization and ions detection. High vacuum systems, atomic beam generations. Diodes laser system, solid state lasers, fiber lasers, dye lasers, optical cavities for second harmonics generation, Raman transitions for manipulating cold atoms, Rydberg atom physics. High accuracy optical and atomic interferometry. Electro-mechanical and opto-mechanical systems. Quantum Hybrid systems.

Teaching Experiences:

Support Teacher for the course: "computational and statistical methods applied to geology" Geology Department, University of Pisa : 2010/2011 and 2011/2012

General Physics. Bachelor course in Geology and Environmental Science, University of Camerino (Class L-32 and L-34): 2013/2014, 2014/2015, 2015/2016, 2016/2017, 2017/2018, 2018/2019, 2019/2020

Advanced Electromagnetism. Master Course in Physical Science (Class LM-17), University of Camerino:
2016/2017, 2017/2018, 2018/2019, 2019/2020

Teacher of PAS courses: DIDATTICA DELLA FISICA DI BASE [PAS044]. 2013/2014

Foreign Languages:
Spoken and written English: Excellent
Spoken French: good Written French: sufficient

Scientific production

OrcidID:
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ResearcherID: J-9898-2016

27 papers on peer-review journal, 7 paper on Conference Journal.
Total Citation: 1177 (al 30/06/2021, Scopus)
Hirsch number: h=18 (al 30/06/2021, Scopus)

Summary of the research activity:

1. Introduction:

My scientific training and research move the first step in the laboratory of Prof. Arimondo in the physics department of the University of Pisa, where I worked, as part of my diploma and master thesis, on Bose Einstein Condensation of alkali atoms clouds and optical lattices.
Following the interest in atomic physics and in the interaction of radiation with matter, after a brief post-graduate experience in the same laboratory, focused on the study of mixtures of ultracold atoms of Cesium and Rubidium, I landed at the Niels Bohr Institute (NBI), University of Copenhagen, initially in the role of "research assistant", similar to a post-graduation position, in the group "AMO group and Laser Lab" at the Oersted Laboratory, under the supervision of Professors Niels Andersen and Jan W. Thomsen and subsequently as a PHD student in the framework of the International PhD School of Excellence of the Niels Bohr Institute in the same laboratory.
During the period of my doctoral research I was involved in the study of ultracold atoms of magnesium whose possible metrological applications as new standard in the frequency domain were extremely appealing. In this context, I have contributed to the development of innovative techniques of laser cooling for the magnesium atoms, in order to overcome the theoretical limit of Doppler cooling for alkaline-earth. I performed spectroscopy of the intercombination line (clock lines) of magnesium and lifetime measurements of the long living triplet states. In the mean time I worked on the development of Yb based hollow crystal fiber laser sources with wavelengths greater than 1130nm, and on the frequency doubling for the generation of wavelengths between the 570nm and 589nm as part of a consortium of research and development (FiberTech), funded by the Danish research Council, which saw among the participants the University of Copenhagen itself, the Danish institute of Metrology (DTM) and the private companies, Koheras and Crystal fiber, a world leaders in the production of fiber lasers , respectively, and quantum-gap hollowfiber.
After earning the title of Phd doctor, and a brief period as a postdoc in the same lab, where I could contribute to other spectroscopical measurements, keeping my interest in the manipulation of atoms, I went for an experience between basic research and technology application. I was granted with a CNRS Post-Doc position, at the inertial sensors section of the Observatoire de Paris- SYRTE (Systèmes de Référence des Temps et Espace).
I worked on the gravimetry experiment, exploiting an atomic interferometer with ultracold atom to measure local gravity with high sensitivity and precision in the context of the international collaboration, 'Watt Balance' project, for the definition of the kilogram.
My research has followed three directions:

1. the increase in the sensitivity of the existing gravimeter at SYRTE.
2. The development and construction of the new experimental apparatus toghter with its preliminary tests and measures. This system is nowdays installed at the LNE facility in Trappes (Paris), working at full regime at the 'Watt Balance' project .
3. The realization (prove of principle) of a portable or semiportable gravimeter for application on the "field".

After the post-doc experience in France I moved back to Italy with a two-years long researcher position (III level) at the CNISM unit of the University of Pisa which has been extend by CNR-INO contribution and University Pisa grant for other two years.
I joined again the ultracold atom group working on two main subjects:

a) Quantum control. In a certain way, I resumed my thesis work on Bose-Einstein condensates in optical lattices, turning my attention to the control of time dependent quantum systems (superadiabatic protocols with strong ties to quantum information) and then to the study of the foundations of quantum mechanics (Quantum speed limit, which is the limit imposed by quantum mechanics to the "speed" of transition between two states).

a) Rydberg excitation. The study of the condensate was soon joined and interwoven with the interest in the physics of ultracold atoms in excited Rydberg states (the valence electron orbitals excited to a "large" principle quantum number n, n > 10), generating a new line of research. The arising of large long range interaction between atoms excited to Rydberg state can be exploited to study several interesting phenomena in many body systems or been exploited for quantum computation.

After the experience in Pisa, I joined the quantum optics and opto-mechanics group of the University of Camerino as a non-permanent researcher, type A (three years long researcher position) so by following my interests in quantum optics and in the field of the "light and matter" interaction,
In the frame of the iQuoems (Interfacing Quantum Optical, Electrical, and Mechanical Systems) European Network (leaded by Camerino), I have the responsibility of starting a new line of research on the electro-opto-mechanical field (hybrid quantum system).
I have also joined the experiment on cavity opto-mechanics and the INFN Humor Project which aims to exploit the properties of macroscopic mechanical oscillator of different masses and extremely precise displacement measurement (typical of opto-mechanical system) to test modifications to quantum mechanics due to quantum gravity effects.

2. Electro and Opto-mechanics.

In 2013 I have joined the Quantum Optics and Cryogenic Lab at the Physics Division of the School of Science and Technology of University of Camerino in the frame of the Iquoems Europran Project, coordinated by Unicam Group. I have started the experimental activity on electro-mechanics in Camerino while I joined the local activity on quantum optics and cavity opto-mechanics. I also joined the INFN-HUMOR project on measurement of phenomenological quantum gravity.
In the frame of the European Network (Iquoems and HOT-Horizon 2020), I have designed a nano-electromechanical oscillator aiming to couple the mechanical oscillator to light by a high finesse cavity, developing in this way a full electro-opto-mechanical system (Hybrid system). This system should be able to work firstly as a classical very efficient transducer between distant radiation frequency domain (MHz to Khz) and a second step as a quantum transducer, placing the system at cryogenic temperature (9 mK). The electromechanically coupling has been achieved and has been showed by both electrical measurement and optical interferometry (Michelson Interferometer and homodyne detection methods). The so called EMIT (Electro-mechanical induced transparency) due to the destructive interference between two interacting oscillator at close frequency (the 'smoking gun' of the presence of the Electro-mechanical coupling) has been observed. Moreover I developed a new electro-mechanical transducer by exploiting a mutim-mode mechanical oscillator, showing both a non-reciprocal transducing properties and increased bandwidth.
In the field of opto-mechanics, I have been working in the developing of new experiments with multiple mechanical oscillators in high-finesse cavity, aiming to show the possibility of entangling many mechanical oscillators by the interaction with the cavity light modes and of reaching the so-called strong coupling regime in the opto-mechanical system. By building a two-SiN membrane device, an increased in the opto-mechanical coupling in a cavity-opto-mechanics has been measured and characterized by experimental parameters.
I collaborate also in the frame of the HUMOR project which aims to measure "quantum gravity" effect on massive macroscopic oscillator. A number of phenomenological theory predicts that quantum gravity should effect the [q,p] commutator for a mechanical oscillator (by generating a third harmonic of the fundamental oscillation mode and non-linear term in the oscillator itself.

In order to bound the non-linear term, we use interferometric techniques (Michelson interferometry) together with homodyne detection. In facts we recorded the decay rate of an excited mechanical oscillator (high quality mechanical oscillator, Q>10^6 at 50K) which showing a linear and a non-linear term which can be related to the quantum gravity phenomenological theory. As the starting point of the second round of measures, we characterized optically and mechanically an ad-hoc mechanical oscillator (a novel circular silicon nitrade membrane), produced by one of our collaborator, which will be used in future HUMOR experiment (specifically for the reaching of the full quantum regime).

3. Rydberg atoms .

In recent years, the excitation of ultracold atoms to Rydberg levels has attracted an increasing attention of the scientific community because of the peculiar properties of such systems, resulting as a promising candidates for the experimental realization of systems for the computation, quantum simulation and at the same time an excellent system to study systems in multi-body in the presence of long-range interaction.

My work on Rydberg Exitation may be summarized in three different part.

1. First of all, the construction and characterization of the apparatus for the production and detection (detection efficiency) of the excitation to Rydberg levels through the ionization with external electric fields (Field Ionization)
2. The study of the dynamics of the excitation to Rydberg state in different many-body system with long-range interaction. We study the excitation case of a Rb atoms in ultracold cloud (trapped in a magneto or optical trap) in different spatial configuration (3D clouds, quasi-one dimensional system) and we study the excitation of a Bose Einstein Condensation in different spatial and geometrical configuration (3D case, quasi-one dimensional case and in 1-D optical lattices). In all this works we observed a dynamics compatible with the phenomenon of the so- called "dipole blockade" due to the presence of long-range interaction - the presence of the interaction term between Rydberg atoms "move" the energy levels of the atoms in the vicinity of a Rydberg excitation, bringing the energy level out of resonance, preventing the excitation of these atoms; in other words the atoms that are located within a radius such that the interaction is not negligible, they share a collective Rydberg excitation (super atom theory).
3. Study of the excitation statistics of many-body system in the presence of long range interaction. First we study the statistics of the on-resonance excitation dynamics (meaning the excitation condition when the exiting laser is resonant with the transition), showing for the first time in the field as the presence of the dipole blockade, with the establishment of long-range correlation, breaks the independence between successive excitations, transforming a phenomenon purely Poissonian in a phenomenon that is described by a sub-Poissonian distribution. In other words we show the possibility to measure the presence of the long range interaction through the counting statistics of the ions detection system. Following this idea, we study the out of resonance excitation. Heuristically the presence of the level shift due to long range interaction (at a determined distance between to atoms) could compensate the detuning of the off-resonance excitation, changing an off-resonance excitation into an on-resonance excitation, resulting in the modification of the excitation statistics. In our work through the recording and the analysis of the 'full counting statistics' (first time in the Rydberg field) of the excitation we were able to show the presence of bimodal counting distribution in the off-resonance case, which is compatible with a bi-stabile dynamics typical of a many-body system in presence of long range interaction and dissipative regime.

4. Bose-Einstein condensation.

My interest in this phenomenon started, as mentioned, in the laboratory of Professor Arimondo where during the thesis I was able to work on an experimental apparatus for the creation and study of a condensate of rubidium 87 in optical lattices.

The optical lattices have proved to be a powerful experimental technique that has allowed on one side to create a bridge between the physics of ultracold atoms and solid state (band theory , phase transitions , Mott insulators) and on the other the investigation of many body quantum systems.

In the initial stage (during my thesis training) I was involved in the experiment which mainly concerned with the study of the behavior of the Bose-Einstein condensate trapped in optical lattices accelerated (equivalent to applying an electric field to electrons in a lattice) or the study of the behavior of the condensate while exploring the energetic bands. it was possible to obtain the first experimental confirmation that the interatomic interaction term of the Gross - Pitaevsky (dependent on the square of the density) substantially change the tunneling (Landau- Zener) between the energy bands, creating an asymmetry between the tunnel probability from the fundamental band to the first excited band and the reverse process. Moreover we show that the arising of instability in the condensate while exploring with different timescale the lower band close to the end of the Brillouin zone.

When I rejoined the Bose-Einstein group in Pisa, optical lattices were still a central investigation technique and I collaborate in the development and the construction of a new experiment, which aimed to reach a precise control of quantum system (so called quantum control theory) which is a fundamental prerequisite for quantum information processing. The experimental study, with the theoretical collaboration of the Scuola Normale Superiore, has implemented two optimal protocols and a third "high-fidelity quantum" protocol (high-fidelity quantum control) with two different purposes. The first two protocols, a kind of quantum "shortcut", which reaches the maximum speed of a quantum transition compatible with the Heisenberg uncertainty principle (quantum speed limit). With the third protocol, we look to the opposite limit: a "superadiabatic " protocol which inhibits interband transitions so that the system is forced to follow the ground state of the instantaneous base (the so called adiabatic basis, considering a time-dependent Hamiltonian) throughout his evolution. This work represents the first measurement of the "quantum speed limit" and it is the first experimental realization of a superadibatic protocol. The generality of these protocols has resulted in the possible applications to other fields of physics from the solid state nuclear magnetic resonance, the coherent manipulation of molecular systems to the ultra-precise measurements and the quantum computation .

5. Cold atom interferometry and gravimetry. Metrology.

After earning the doctorate, I decided to experience a post-doctoral position in the context of cold atoms but witn a different approach, closer to the applications and the technological development. So that my choice fell on an atomic interferometry experiment to measure the acceleration of gravity g in the frame of the Watt Balance of the LNE as part of the experimental effort in redefining the unit of measurement kilogram.

Although this experiment has certainly reasons of a fundamental redefinition of the kilogram the general test of gravity at short distances and ultra-precise measurements of surface forces, the development of interferometers such as inertial detectors attracts great interest for applications in the geophysical measurements to accompany the magnetometers to search mining, navigation (gyroscopes and inertial gravity) , especially where the satellite navigation systems are inefficient (jamming signal in case of conflict) or unusable (eg submarines) .

Skeeping the details the gravimeter consists of a Bordé – Segnac interferometers that uses Raman transition created by two counterpropagating laser beams in a vertical position.

Raman transitions during the free fall of the atoms manipulate the wave function of atoms so that the phase difference between atoms that travel different branches of the interferometer is proportional to the acceleration of gravity .
In this context, I initially worked on the first version of the gravimeter (alpha version) that has been designed and characterized in order to define the limits of sensitivity of the instrument, limits both technical (mechanical noise, noise sources associated with coherent optical aberration, the magnetic fields residues), and systematic errors of the intrinsic nature (solar tides, the Coriolis force) .
The systematic investigation of the sources of error of this interferometer has been my first task and at the same time such an experiment has stimulated the investigation of new ways to increase the visibility of the interferometric fringes and thus the sensitivity of the apparatus (experiment of " double diffraction ") and led to the construction of a second apparatus (gravimeter beta) with the design of a dipole trap .
Therefore my work followed several fronts:

1. the systematic investigation of the gravimeter
2. Development of a modification of the original set-up to perform an experiment which placed a limit on the level of sensitivity obtained with the original version of the gravimeter (double diffraction experiment)
3. The construction and the metrological characterization of the new set-up (beta version) which is nowdays the working interferometer at the Watt-Balance project site in Trappes-LNE, Paris.
4. The design and construction of a compact gravimeter, which has been demonstrated experimentally the feasibility of building a portable or semi- portable system for 'field' application.

In conclusion the research in the laboratories of SYRTE expanded my scientific training while putting me in touch with the needs of an advanced metrology experiment that makes the stability and reproducibility of long-term results mandatory and as an essential prerogative to any metrological experiment, allowing me to work on the border between basic research and technological development.

6. Laser cooling and spectroscopy of magnesium.

In this part I will give particular importance to the experience and the work done during the PhD. It focuses on three main aspects: the search for innovative techniques for subdoppler cooling of magnesium **[28]**, the lifetime measurements of the intercombination line for metrological interest through spectroscopic measurements of ultracold atoms **[25,27]** and the development of innovative fiber laser sources to cover after duplication, the frequency range between 570nm and 590nm, important for many applications.
The participation in such experiments allowed me to work with different types of coherent sources: dye laser, solid state laser (Titanium Sapphire) , diode laser , fiber laser and with cavities for second harmonic generation at different lengths , 285nm , 457nm , 383 nm. At the same time allowed me to do experience in molecular spectroscopy with the development of an frequency stabilization for the a dye laser (570 nm) through polarization spectroscopy of diatomic molecule of iodine. In this way the stabilization close to the transition of the trap magnesium was possible. Simultaneously allowed me to work on the development of a fiber laser (ring - fiber laser) doped with Ytterbium with the aim of producing a source relatively narrow (< 1Mhz) with a wavelength greater than 1130nm (the current technology of fiber laser is extremely inefficient at these wavelengths) to be amplified with an additional stage that exploited the peculiar properties of the band-gap hollow fibers (prototypes made by the company Crystal fiber) for a new type of amplifier fiber .
The core of my thesis work is certainly the development of a cooling technique that allowed us to demonstrate that it is possible to cool magnesium neutral atoms below the Doppler

limit temperature (1.9 mK) . Without going into details the achievement of temperatures below the Doppler limit (100 microKelvin) is a prerequisite for creating more complex experiments both in metrology (atomic clocks), and in other context, from Bose- Einstein Condensation to quantum computation (the alkaline earth metals are attracting more and more attention in this context) or the study of molecular Photo-association, just to mention a few examples.
The central idea of this cooling technique is to exploit a second transition (881nm , produced by a solid state laser Titanium- Sapphire, in turn, pumped with a solid state laser at 532nm) that connects the first excited state with a higher state, creating a three level system in the ladder configuration which is interacting with two coherent radiations. In this condition and under specific choices of the parameters (frequency and intensity of the laser), the atomic populations of the fundamental and the first excited level of the system in equilibrium may differ substantially from those of a pure two-level system, thus creating a different cooling effect induced by the two laser radiation. In other words, in the vicinity of the two-photon transition (when the detuining compensates eachother) choerences are generated between the atomic states and thanks to Electomagnetically induced transparency we have experimentally observed the decrease of temperature of ultracold atoms of magnesium below the Doppler temperature expected for such a configuration. From an experimental point of view it is observed the effect of the laser at 881nm on a cloud of ultracold atoms of magnesium trapped in a MOT at 285nm by measuring the size of the cloud as a function of the frequency of the laser at 881nm . My work in this context was carried out over two tasks: the first is strictly experimental with the construction of part of the apparatus necessary for the measurement, investigating preliminary spectroscopic measurements of the line at 881nm and the realization of the experiment itself; the other task has been theoretically modeling the experiment which involved the study of optical-Bloch equations for the three-level system and finding how temperature varies in this condition. I show that it was possible to relate the radius of the atomic cloud to the doppler temperature of a three-level system . This model has shown good agreement with experiments.
Another point of great interest both theoretically and experimentally is the measurement of the lifetimes of the triplet levels in the alkaline-earth for the implications in metrology and in theoretical modeling of atomic structure. For this reason a part of my PhD was devoted to the measurement of the natural lifetime of the 3P1 state in magnesium, measurement was stimulated by several theoretical work on the subject and by the fact that no previous measurement was accomplished with ultracold atoms, thus ensuring with this experiment a different systematic errors in measurement. My role in this experiment is again twofold, firstly I participated in the construction of the necessary part of the set-up, the preliminary spectroscopic measurements and the implementation of measures, secondly I have participated in the development of a theoretical model that could interpret the data acquired by us. Not entering into the detail of the experiment the result (4.4+/-0.9 ms) is in agreement with recent theoretical calculations and is compatible with the latest available measurements obtained using atomic beams. During the period following the thesis I have been involved in the construction of a new duplication cavity at 383nm , new lifetime

7. Conclusions

In summary, my research work has touched and touches the frontier of scientific research, focusing in the field where the radiation-matter interaction plays a key role both as a tool of scientific inquiry and as a starting point for technological development in the service of others branches of physics and science in general.
I acquire a good scientific flexibility and the ability of easily integrating into new working environments.

Pubblications

1. Malossi, N., Piergentili, P., Li, J., Serra, E., Natali, R., Di Giuseppe, G., Vitali, D. *"Sympathetic cooling of a radio-frequency LC circuit to its ground state in an optoelectromechanical system"* (2021) Physical Review A, 103 (3), art. no. 033516, .

2. Bonaldi, M., Borrielli, A., Chowdhury, A., Di Giuseppe, G., Li, W., Malossi, N., Marino, F., Morana, B., Natali, R., Piergentili, P., Prodi, G.A., Sarro, P.M., Serra, E., Vezio, P., Vitali, D., Marin, F. "Probing quantum gravity effects with quantum mechanical oscillators" (2020) European Physical Journal D, 74 (9), art. no. 178

3. Li, W., Piergentili, P., Li, J., Zippilli, S., Natali, R., Malossi, N., Di Giuseppe, G., Vitali, D. "Noise robustness of synchronization of two nanomechanical resonators coupled to the same cavity field" (2020) Physical Review A, 101 (1), art. no. 013802

4. Piergentili, P., Catalini, L., Bawaj, M., Zippili, S., Malossi, N., Natali, R., Vitali, D., Di Giuseppe, G. "Sandwich in the middle: Enhancing the optomechanical coupling" (2019) 2019 Conference on Lasers and Electro-Optics Europe and European Quantum Electronics Conference, CLEO/Europe-EQEC 2019, art. no. 8871681, .

5. Piergentili, P., Catalini, L., Bawaj, M., Zippili, S., Malossi, N., Natali, R., Vitali, D., Di Giuseppe, G. "Two-membrane cavity optomechanics" (2019) Optics InfoBase Conference Papers, Part F165-QIM 2019, .

6. Piergentili, P., Catalini, L., Bawaj, M., Zippili, S., Malossi, N., Natali, R., Vitali, D., Di Giuseppe, G. "Sandwich in the middle: Enhancing the optomechanical coupling" (2019) Optics InfoBase Conference Papers, Part F143-EQEC 2019, art. no. 2019-jsv_3_3,

**7. Piergentili, P., Catalini, L., Bawaj, M., Zippilli, S., Malossi, N., Natali, R., Vitali, D., Giuseppe, G.D.
"Two-membrane cavity optomechanics"
(2018) New Journal of Physics, 20 (8), art. no. 083024, . Cited 29 times.**

**8. Moaddel Haghighi, I., Malossi, N., Natali, R., Di Giuseppe, G., Vitali, D.
"Sensitivity-Bandwidth Limit in a Multimode Optoelectromechanical Transducer"
(2018) Physical Review Applied, 9 (3), art. no. 034031**

9. Moaddel Haghighi, I., Malossi, N., Natali, R., Di Giuseppe, G., Vitali, D. "Interference-based multimode opto-electro-mechanical transducers" (2018) Proceedings of SPIE - The International Society for Optical Engineering, 10674, art. no. 106740B, .

10. Haghighi, I.M., Malossi, N., Natali, R., Di Giuseppe, G., Vitali, D. "Optical detection of weak electrical signals with hybrid optoelectro-mechanical devices" (2017) Optics InfoBase Conference Papers, Part F81-EQEC 2017, 1 p.

**11. Valado, M.M., Simonelli, C., Scotto, S., Malossi, N.
"Signatures of strong interactions in Rydberg systems"
(2016) European Physical Journal: Special Topics, 225 (15-16), pp. 3037-3060.**

**12 Li, J., Xuereb, A., Malossi, N., Vitali, D.
"Cavity mode frequencies and strong optomechanical coupling in two-membrane cavity optomechanics"
(2016) Journal of Optics (United Kingdom), 18 (8), art. no. 084001, . Cited 21 times.**

13. Serra, E., Bawaj, M., Borrielli, A., Di Giuseppe, G., Forte, S., Kralj, N., Malossi, N., Marconi, L., Marin, F., Marino, F., Morana, B., Natali, R., Pandraud, G., Pontin, A., Prodi, G.A., Rossi, M., Sarro, P.M., Vitali, D., Bonaldi, M.

"Microfabrication of large-area circular high-stress silicon nitride membranes for optomechanical applications" (2016) AIP Advances, 6 (6), art. no. 065004, . Cited 19 times.

14 . Li, J., Haghighi, I.M., Malossi, N., Zippilli, S., Vitali, D.
"Generation and detection of large and robust entanglement between two different mechanical resonators in cavity optomechanics"
(2015) New Journal of Physics, 17 (10), art. no. 103037, . Cited 60 times.

15. Malossi, N., Valado, M.M., Arimondo, E., Morsch, O., Ciampini, D.
Rydberg excitation of a Bose-Einstein condensate
(2015) Journal of Physics: Conference Series, 594 (1), art. no. 012041.

16. Malossi, N., Valado, M.M., Scotto, S., Huillery, P., Pillet, P., Ciampini, D., Arimondo, E., Morsch, O.
"Full counting statistics and phase diagram of a dissipative rydberg gas"
(2014) Physical Review Letters, 113 (2), art. no. 023006

17. Malossi, N., Valado, M.M., Scotto, S., Morsch, O., Arimondo, E., Ciampini, D.
"Strongly correlated excitation of a quasi-1D Rydberg gas"
(2014) Journal of Physics: Conference Series, 497 (1), art. no. 012031

18. Valado, M.M., Malossi, N., Scotto, S., Ciampini, D., Arimondo, E., Morsch, O.
"Rydberg tomography of an ultracold atomic cloud"
(2013) Physical Review A - Atomic, Molecular, and Optical Physics, 88 (4), art. no. 045401

19. Malossi, N., Bason, M.G., Viteau, M., Arimondo, E., Mannella, R., Morsch, O., Ciampini, D.
"Quantum driving protocols for a two-level system: From generalized Landau-Zener sweeps to transitionless control"
(2013) Physical Review A - Atomic, Molecular, and Optical Physics, 87 (1), art. no. 012116

20. Malossi, N., Bason, M.G., Viteau, M., Arimondo, E., Ciampini, D., Mannella, R., Morsch, O.
Quantum driving of a two level system: Quantum speed limit and superadiabatic protocols - An experimental investigation
(2013) Journal of Physics: Conference Series, 442 (1), art. no. 012062

21. Viteau, M., Bason, M., Radogostowicz, J., Malossi, N., Morsch, O., Ciampini, D., Arimondo, E.
"Rydberg excitation of a Bose-Einstein condensate"
(2013) Laser Physics, 23 (1), art. no. 015502

22. Viteau, M., Huillery, P., Bason, M.G., Malossi, N., Ciampini, D., Morsch, O., Arimondo, E., Comparat, D., Pillet, P.
"Cooperative excitation and many-body interactions in a cold rydberg gas
(2012) " Physical Review Letters, 109 (5), art. no. 053002

23. Bason, M.G., Viteau, M., Malossi, N., Huillery, P., Arimondo, E., Ciampini, D., Fazio, R., Giovannetti, V., Mannella, R., Morsch, O.
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International school of Physics. Enrico Fermi: Metrology and fundamental constants. Luglio 18th a Luglio 28th, 2006, Varenna, Como Lake.

CAUAC Network Meeting, Porquerolles, France. April 24-27, 2004
Poster: "Experimental studies of cold magnesium atoms"
Talk: "Non-linear effect of ^{87}Rb BEC in optical lattices: asymmetric tunneling and instabilities"

DFS(Danish Physical Society) annual meeting, Nyborg, Denmark. May 27-28, 2004
Poster: "Study of the two-levels atoms dynamics by release and recapture experiments"

ECAMP(8th European Conference on Atomic and Molecular physics), Rennes, France. July 6-10, Poster: "Experimental studies of cold magnesium atoms"

DFS(Danish Physical Society) annual meeting, Nyborg, Denmark. May 2-3 2005,
Poster: "Two-photon cooling of magnesium atoms"
Talk: "Two-photon cooling of magnesium atoms"

YAO 2006, Paris, France 14-18 February 2006
Poster: "Two-photon cooling of magnesium atoms: towards an atomic clock"

"Watt balance technical meeting - WBTM". March 17-18, 2009 BIPM / Sèvres - France "JCRB meeting"

CLEO/IQEC 2009, Baltimore, Maryland, USA, May 31 to June 5
Talk: "Accuracy of a high sensitivity interferometer"

CLEO/EQCL 2011, Munich, Germany, 22/05/2011 al 26/05/2011
Talk: "Rydberg excitation in one dimensional systems and optical lattices"

DICE 2012, Sixth International Workshop, Castello Pasquini/Catiglioncello, Livorno, Li, Italia, 17/10/2012-21/10/2012

Frontiers of Opto and ElectroMechanics workshop, Fai della Paganella (Italy) – January 27 – 30, 2014

IQIS 2014 Salerno (ITALY) September 15-19 2014

IQIS 2016, Rome(Italy) – 20-23 September 2016

SPIE-Photonics 2018, Strasbourg(France) , 22-26 April 2018

CLEO/EUROPE Munich (Germany) 23-27 June 2019

PIERS 2019 Xiamen (China) 17-20 December 2019

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