

(ALLEGATO B)

DICHIARAZIONI SOSTITUTIVE DI CERTIFICAZIONI

(art. 46 D.P.R. n. 445/2000)

DICHIARAZIONI SOSTITUTIVE DELL'ATTO DI NOTORIETÀ

(art. 47 D.P.R. n. 445/2000)

__I__ sottoscritt__

COGNOME Gessner
(per le donne indicare il cognome da nubile)

NOME Manuel

NATO A __ **PROV.** __

IL __

ATTUALMENTE RESIDENTE A __

__ **PROV.** __

INDIRIZZO __ **C.A.P.** __

TELEFONO __

Visto il D.P.R. 28 dicembre 2000, n. 445 concernente "T.U. delle disposizioni legislative e regolamentari in materia di documentazione amministrativa" e successive modifiche ed integrazioni;

Vista la Legge 12 novembre 2011, n. 183 ed in particolare l'art. 15 concernente le nuove disposizioni in materia di certificati e dichiarazioni sostitutive (*);

Consapevole che, ai sensi dell'art.76 del DPR 445/2000, le dichiarazioni mendaci, la falsità negli atti e l'uso di atti falsi sono punite ai sensi del Codice penale e delle leggi speciali vigenti in materia, dichiara sotto la propria responsabilità che quanto dichiarato nel seguente curriculum vitae et studiorum comprensivo delle informazioni sulla produzione scientifica corrisponde a verità

CURRICULUM VITAE – MANUEL GESSNER

PERSONAL INFORMATION

Date of Birth

Nationality

PRESENT POSITION

Ramón y Cajal Fellow

Affiliation IFIC – Instituto de Física Corpuscular
Departamento de Física Teórica
Universidad de València, CSIC

Work Address C/ Dr. Moliner 50, 46100 Burjassot (Valencia), Spain

EDUCATION

01/04/2012 – 30/09/2015 PhD (Physics)
University Albert-Ludwigs-Universität Freiburg, Germany
Advisor Andreas Buchleitner
Degree Dr. rer. nat.
Grade *summa cum laude (1,0)*¹
Dissertation *Dynamics and characterization of composite quantum systems*
Date of defense 20.07.2015

01/10/2005 – 09/09/2011 Studies of Physics (Diplom)
University Albert-Ludwigs-Universität Freiburg, Germany
Thesis Advisor Heinz-Peter Breuer
Grade *with distinction (1,0) ("sehr gut mit Auszeichnung")*¹
Thesis Title *Initial correlations in open quantum systems*

01/09/2007 – 31/07/2008 Erasmus Studies
University Universidad Complutense de Madrid, Spain

01/08/1996 – 31/03/2005 Abitur (German High School Degree)
School Max-Planck-Gymnasium Trier, Germany

PROFESSIONAL EXPERIENCE

01/01/2023 – Ramón y Cajal Fellow
Institution IFIC, Universidad de Valencia

30/07/2022 – 31/12/2022 CDEIGENT Distinguished Researcher
Institution IFIC, Universidad de Valencia

01/11/2021 – 29/07/2022 Research Fellow
Institution ICFO – Institute of Photonic Sciences, Barcelona, Spain
Host Antonio Acín. "Quantum information theory"

06/12/2018 – 31/10/2021 Junior Research Chair
Institution École Normale Supérieure, Paris, France
LKB – Laboratoire Kastler Brossel

01/10/2015 – 30/11/2018 Post-Doctoral Researcher
Institution QSTAR – Quantum Science and Technology in Arcetri
LENS – European Laboratory for Nonlinear Spectroscopy
INO-CNR – Istituto Nazionale di Ottica, Consiglio Nazionale delle Ricerche
Florence, Italy
Group Augusto Smerzi. "Quantum interferometry"

¹ German grading system: From 1,0 (best) to 6,0 (worst).

01/04/2012 – 30/09/2015 PhD Student, Research Assistant, Teaching Assistant
University Albert-Ludwigs-Universität Freiburg, Germany
Group Andreas Buchleitner. "Quantum optics and statistics"

01/09/2012 – 20/06/2013 Visiting Researcher
University University of California, Berkeley, USA
Group Hartmut Häffner. "Quantum information with trapped ions"

OTHER LONGER RESEARCH VISITS (> TWO WEEKS)

04/04/2022 – 22/04/2022 Istituto Nazionale di Ottica, Florence, Italy
Host Augusto Smerzi

Aug. 2017 Shanxi University, Taiyuan, China
Host Weidong Li, Xiaolong Su

Dec. 2016, Feb. 2017, Dec. 2017, Apr. 2018 Leibniz Universität Hannover, Germany
Host Klemens Hammerer, Carsten Klempt, Luis Santos, Piet Schmidt

16/11/2011 – 20/12/2011 University of Turku, Finland
Host Jyrki Piilo. Group on "Non-Markovian Processes and Complex Systems"

POSITIONS AND FELLOWSHIPS

01/01/2023 - Ramón y Cajal Fellow
Universitat de València, Valencia, Spain

30/07/2022 – 31/12/2022 CDEIGENT Fellow
Universitat de València, Valencia, Spain

08/11/2021 – 29/07/2022 Research Fellow, "la Caixa" Junior Leader, Marie Curie fellow
ICFO-Institute of Photonic Sciences, Barcelona, Spain

01/11/2021 – 07/11/2021 Research Fellow, Principal investigator of Proyecto JIN "QAMELIA"
ICFO-Institute of Photonic Sciences, Barcelona, Spain

06/12/2018 – 31/10/2021 Junior Research Chair
École Normale Supérieure, Paris, France

01/12/2016 – 30/11/2018 Feodor-Lynen Post-Doctoral Research Fellowship
Alexander von Humboldt foundation
Humboldt host: Massimo Inguscio
Research carried out in the group of Augusto Smerzi

04/12/2015 – 03/12/2016 Assegno di Ricerca
Istituto Nazionale di Ricerca Metrologica (INRiM), Turin, Italy
Research carried out at LENS, Florence

01/04/2012 – 30/09/2015 PhD Scholarship
Studienstiftung des Deutschen Volkes
(German Academic Scholarship Foundation)

01/09/2012 – 20/06/2013 Visiting Researcher
University of California, Berkeley

01/09/2007 – 31/07/2008 Erasmus Scholarship
Universidad Complutense de Madrid

AWARDS AND DISTINCTIONS

- 2022 Ramón y Cajal Fellowship
Agencia Estatal de Investigación, Ministerio de Ciencia, Innov. y Univ. (Spain)
- 2021 CDEIGENT Researcher Position
Generalitat Valenciana
- 2021 "la Caixa" Junior Leader Laureate
Foundation "la Caixa"
- 2021 Principal Investigator of a "Proyecto JIN"
Agencia Estatal de Investigación, Ministerio de Ciencia, Innov. y Univ. (Spain)
- 2018 Junior Research Chair Laureate
École Normale Supérieure, Paris
- 2018 IOP Outstanding Reviewer
New Journal of Physics
- 2016 Feodor Lynen Research Fellowship
Alexander von Humboldt Foundation ([website](#))
- 2016 Best talk award
Italian Quantum Information Science Conference, Rome ([website](#))
- 2016 Selection of the Dissertation for publication as Springer textbook
Springer Theses Series
"Recognizing outstanding PhD research" ([website](#))
- 2012 – 2015 PhD Scholarship
Studienstiftung des Deutschen Volkes
German Academic Scholarship Foundation ([website](#))
- 2012 Alumni Award for the Diploma Thesis
Alumni Freiburg e.V.
- 2007 – 2008 Erasmus Scholarship (1 year)
Universidad Complutense de Madrid, Spain
- 2005 Award for achievements in high school physics
Deutsche Physikalische Gesellschaft (DPG) / German Physical Society

TEACHING EXPERIENCE

Universidad de Valencia as main lecturer

- 2024/2025 Physics I (Grado en Química)
- 2024/2025 Quantum Physics Laboratory
- 2023/2024 Physics I (Grado en Química)
- 2023/2024 Quantum Physics Laboratory
- 2022/2023 Physics I (Grado en Química)
- 2022/2023 Quantum Physics Laboratory

Master at the International Center for Theoretical Physics (ICTP), École Normale Supérieure, Paris as Master tutor

- 2020/2021 Symmetries in Physics, Frédéric Chevy
- 2019/2020 Symmetries in Physics, Frédéric Chevy

Bachelor's and Master's degrees at the University of Freiburg, Germany as tutor

- 2014 Quantum Mechanics, Andreas Buchleitner
- 2013/2014 Advanced Quantum Mechanics, Heinz-Peter Breuer
- 2012 Dissipative Processes in Atom-Light Interaction, Hanspeter Helm
- 2011 Advanced Physics Lab, Karl Jakobs
- 2010/2011 Physics Lab for Medicine Students, Hanspeter Helm
- 2010 Advanced Physics Lab, Karl Jakobs
- 2009/2010 Electrodynamics and Special Relativity, Heinz-Peter Breuer
- 2009 Classical Mechanics and Special Relativity, Johannes Berg
- 2008/2009 Introduction to Experimental Physics, Karl Jakobs

STUDENT SUPERVISION

PhD

- 2025 – Balazs Novak, Universitat de València
- 2024 – Luca Ion, Universitat de València
Co-supervised with Armando Perez
- 2023 – Irene García Martínez, Universitat de València
- 2020 – 2024 Youcef Baamara, Sorbonne Université
Quantum gases, correlations and quantum metrology
Co-supervised with Alice Sinatra

Master's

- 2024 – 2025 Master's thesis (TFM) [ongoing]
Arian Murillo, Universidad de Valencia
- 2022 Master's thesis (TFM)
Pau Colomer Saus, Universidad de Barcelona
Awarded "Matrícula de honor"
Awarded "Premi Jordi Porta i Jué de la Societat Catalana de Física (Accèssit)"
- 2019 – 2020 Master's thesis
Shao-Hen Chiew, Paris MinesTech
- 2020 M2 Internship
Youcef Baamara, Sorbonne Université
· Co-supervised with Alice Sinatra
- 2020 M2 Internship
Clémentine Rouvière, Sorbonne Université
· Co-supervised with Nicolas Treppe
- 2013 – 2014 Master's thesis
Edoardo G. Carnio, Albert-Ludwigs-Universität Freiburg
· *Awarded as outstanding thesis with the Alumni Award 2015*

- Co-supervised with Andreas Buchleitner

Bachelor's / Internships

- 2025 Bachelor's tesis (TFG) [ongoing]
Maria Colado Montañés, Universitat de València
· Co-supervised with Irene García
- 2025 Bachelor's tesis (TFG) [ongoing]
Celestino Bixquert Marrades, Universitat de València
· Co-supervised with Armando Perez
- 2023 – 2024 Bachelor's tesis (TFG)
Sergio Rodríguez Serreguet, Universitat de València
- 2022 – 2023 Bachelor's tesis (TFG)
Javier Gil Garcera, Universitat de València
- 2022 – 2023 Beca de colaboración (240h)
Pablo Rodenas Ruiz, Universitat de València
- 2019 M1 Internship
Youcef Baamara, Sorbonne Université
· Co-supervised with Alice Sinatra

CONFERENCE ORGANIZATION

- 08/10-10/10/2014 Nonlinear Spectroscopy Meets Quantum Optics
Freiburg Institute of Advanced Studies (FRIAS), Germany
· Funded by FRIAS Junior Research Conference Grant: 8.000,00 €
· Conceived, proposed and co-organized together with Frank Schlwin
· (link to [website](#))
- 04/11-08/11/2024 7th Intl. Conference for Young Quantum Information Scientists (YQIS24)
Inria, Paris
Chair of the program committee

PERSONAL COMPETITIVE RESEARCH GRANTS

- 2023 – Ramón y Cajal Grant (Spanish Ministry of Science and Innovation)
University of Valencia
Total awarded budget: 244.900 €
- 2022 CDEIGENT (Plan GenT, Generalitat Valenciana)
University of Valencia
Total awarded budget: 340.000 €
- 2021 – 2022 “la Caixa” Junior Leader Grant (“la Caixa” Foundation)
ICFO-The Institute of Photonic Sciences
Total awarded budget: 289.950 €
- 2018 – 2021 Junior Research Chair Grant (École Normale Supérieure, Paris)
École Normale Supérieure, Paris
Total awarded budget: 240.000,00 €

RESEARCH PROJECTS

- 2025 – Consolidación Investigadora 2024
Superresolution imaging with quantum-enhanced precision (SIQUEP)
PI: Manuel Gessner
Total awarded budget: 199.901 €
- 2024 – Spanish National Grant; MCIN PID2023
Quantum metrology with limited measurements (QLiMes)
PI: Manuel Gessner
Total awarded budget: 78.750 € + 1 PhD Position (FPI) of 125.000 €
- 2021 – 2022 Spanish National Grant; MCIN PID2020, Proyecto JIN, PID2020-115761RJ-I00
Quantum-enhanced multiparameter measurements with light and atoms (QAMELIA)
ICFO-The Institute of Photonic Sciences
PI: Manuel Gessner
Total awarded budget: 181.500 €
- 2019 – 2022 QuantERA (ERA-NET Cofund)
Application-ready superresolution in space and frequency (ApresSF)
PIs: L. Rudnicki, C. Silberhorn, Z. Hradil, L. Sánchez-Soto, N. Treps (LKB),
J.-F. Morizur
LKB Co-Investigators: C. Fabre, M. Gessner
Total budget: 925.505,40 €
Local (LKB) budget: 254.880,00 €
- 2018 – 2021 QuantERA (ERA-NET Cofund)
Controlling EPR and Bell correlations in Bose-Einstein condensates (CEBBEC)
PIs: C. Westbrook, C. Klempt, M. Bonneau, G. Toth, A. Smerzi (INO-CNR)
Co-Investigators: D. Boiron, E. Rasel, J. Schmiedmayer, M. Gessner
Total budget: 2.159.320,00 €
Local (INO-CNR) budget: 178.313,00 €
- 2018 – 2021 QuantERA (ERA-NET Cofund)
Cavity-enhanced Quantum optical Clocks (Q-Clocks)
PIs: F. Levi, R. Franzosi (INO-CNR), J. W. Thomsen, M. Mitchell, J. Lodewyck, M. Zawada
INO-CNR Co-Investigators: M. Gessner, L. Pezzè, A. Smerzi
Total budget: 2.364.640,00 €
Local (INO-CNR) budget: 200.475,00 €
- 2018 – 2020 Flagship H2020-FETFLAG
Quantum simulation and entanglement engineering in quantum cascade laser frequency
combs (QOMBS)
PI: A. Smerzi
Contribution: Writing sections of proposal and CV listed under personnel.
Total budget: 9.335.635,00 €
Local (INO-CNR) budget: 2.531.723,75 €

EVALUATION ACTIVITY

External expert evaluator	PhD applications for the Doctoral School “Quantum Science and Technologies (QUSTEC)” at EUCOR European Campus (EU Horizon 2020) Participation in 1 st , 2 nd and 3 rd call (2019/2020). Master’s thesis evaluation 2022 for the Master “Quantum Science and Technology” at Universitat de Barcelona Master’s thesis evaluation 2024 for the Master “Física Avanzada” at Universitat de Valencia
PhD Defense	Evaluator for 1 PhD thesis, Universitat de València (2025)
Grant evaluation	QuantERA (EU Horizon 2020) call 2021 Spanish MCIN/AEI Generación de Conocimiento 2022 SONATA19, Polish National Science Centre, 2024 Ramón y Cajal call 2023, Member of the selection panel

REFeree ACTIVITY

Journals	>15 journals including Nature, Nat. Photonics, Nat. Commun., PRL, PRX Quantum, ca. 10 reports / year
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OUTREACH ACTIVITY

Programa Conèixer	Quantum Physics Laboratory (UV) for High School Students 2024 and 2025
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LIST OF PUBLICATIONS: OVERVIEW

Summary	61 peer-reviewed publications, 1 as single author, 26 as first author, 13 as last author 1 Nature Physics, 4 Nature Communications, 13 Physical Review Letters		
Identifiers	ORCID	Researcher ID	SCOPUS
	0000-0003-4203-0366	P-6827-2016	53983938400
Metrics	Source	Google Scholar	Web of Science
	(retrieved 03/02/2025)		
	Total number of citations	2197	1454
	h-index	26	22

PREPRINTS CURRENTLY UNDER PEER REVIEW

[1] M. Fadel, N. Roux, [M. Gessner](#)
Quantum metrology with a continuous-variable system
arXiv:2411.04122

PEER-REVIEWED PUBLICATIONS

- [61] F. Centrone and M. Gessner,
Breaking local quantum speed limits with steering, s
Physical Review Research **6**, L042067 (2024).
<https://doi.org/10.1103/PhysRevResearch.6.L042067>
- [60] V. Gebhart, M. Gessner, and A. Smerzi
Fundamental bounds for parameter estimation with few measurements
Physical Review Research **6**, 043261 (2024).
<https://doi.org/10.1103/PhysRevResearch.6.043261>
- [59] D. Barral, M. Isoard, G. Sorelli, M. Gessner, N. Treps, M. Walschaers
Metrological detection of entanglement generated by non-Gaussian operations
New Journal of Physics **26**, 083012 (2024).
<https://doi.org/10.1088/1367-2630/ad6475>
- [58] G. Sorelli, M. Gessner, M. Walschaers, N. Treps
Gaussian quantum metrology for mode-encoded parameters: general theory and imaging applications
New Journal of Physics **26**, 073022 (2024).
<https://doi.org/10.1088/1367-2630/ad5eb2>
- [57] T. Linowski, K. Schlichtholz, G. Sorelli, M. Gessner, M. Walschaers, N. Treps, Ł. Rudnicki
Application range of crosstalk-affected spatial demultiplexing for resolving separations between unbalanced sources
New Journal of Physics **25**, 103050 (2023).
<https://doi.org/10.1088/1367-2630/ad0173>
- [56] J. Guo, F.-X. Sun, D. Zhu, M. Gessner, Q. He, M. Fadel
Detecting Einstein-Podolsky-Rosen steering in non-Gaussian spin states from conditional spin-squeezing parameters
Physical Review A **108**, 012435 (2023).
<https://doi.org/10.1103/PhysRevA.108.012435>
- [55] M. Gessner, N. Treps, C. Fabre
Estimation of a parameter encoded in the modal structure of a light beam: a quantum theory
Optica **10**, 996 (2023).
<https://doi.org/10.1364/OPTICA.491368>
- [54] M. Fadel, B. Yadin, Y. Mao, T. Byrnes, M. Gessner
Multiparameter quantum metrology and mode entanglement with spatially split nonclassical spin states
New Journal of Physics **25**, 073006 (2023).
<https://dx.doi.org/10.1088/1367-2630/ace1a0>
- [53] M. Gessner and A. Smerzi
Hierarchies of Frequentist Bounds for Quantum Metrology: From Cramér-Rao to Barankin
Physical Review Letters **130**, 260801 (2023).
<https://doi.org/10.1103/PhysRevLett.130.260801>

- [52] Y. Baamara, M. Gessner, A. Sinatra
Quantum-enhanced multiparameter estimation and compressed sensing of a field
SciPost Physics **14**, 050 (2023).
<https://dx.doi.org/10.21468/SciPostPhys.14.3.050>
- [51] N. Biagi, S. Francesconi, M. Gessner, M. Bellini, A. Zavatta
Remote Phase Sensing by Coherent Single Photon Addition
Advanced Quantum Technologies, 2200039 (2022).
<https://doi.org/10.1002/qute.202200039>
- [50] I. Karuseichyk, G. Sorelli, M. Walschaers, N. Treps, and M. Gessner
Resolving mutually-coherent point sources of light with arbitrary statistics
Physical Review Research **4**, 043010 (2022).
<https://doi.org/10.1103/PhysRevResearch.4.043010>
- [49] C. E. Lopetegui, M. Gessner, M. Fadel, N. Treps, M. Walschaers
Homodyne detection of non-Gaussian quantum steering
PRX Quantum **3**, 030347 (2022).
<https://doi.org/10.1103/PRXQuantum.3.030347>
- [48] G. Sorelli, M. Gessner, M. Walschaers, N. Treps
Quantum limits for resolving Gaussian sources
Physical Review Research **4**, L032022 (2022).
<https://doi.org/10.1103/PhysRevResearch.4.L032022>
- [47] Y. Baamara, A. Sinatra, M. Gessner
Squeezing of nonlinear spin observables by one axis twisting in the presence of decoherence: An analytical study
Comptes Rendus Physique **23**, 1 (2022).
<https://doi.org/10.5802/crphys.103>
- [46] M. Fadel and M. Gessner
Entanglement of Local Hidden States
Quantum **6**, 651 (2022).
<https://doi.org/10.22331/q-2022-02-15-651>
- [45] S.-H. Chiew and M. Gessner
Improving sum uncertainty relations with the quantum Fisher information
Physical Review Research **4**, 013076 (2022).
<https://doi.org/10.1103/PhysRevResearch.4.013076>
- [44] R. Y. Teh, M. Gessner, M. D. Reid, M. Fadel
Full multipartite steering inseparability, genuine multipartite steering and monogamy for continuous variable systems
Physical Review A **105**, 012202 (2022).
<https://doi.org/10.1103/PhysRevA.105.012202>
- [43] Y. Baamara, A. Sinatra, M. Gessner
Scaling laws for the sensitivity enhancement of non-Gaussian spin states
Physical Review Letters **127**, 160501 (2021).
<https://doi.org/10.1103/PhysRevLett.127.160501>

- [42] G. Sorelli, M. Gessner, M. Walschaers, N. Treps
Moment-based superresolution: Formalism and applications
Physical Review A **104**, 033515 (2021).
<https://doi.org/10.1103/PhysRevA.104.033515>
- [41] G. Sorelli, M. Gessner, M. Walschaers, N. Treps
Optimal Observables and Estimators for Practical Superresolution Imaging
Physical Review Letters **127**, 123604 (2021).
<https://doi.org/10.1103/PhysRevLett.127.123604>
- [40] P. Feldmann, C. Klempt, A. Smerzi, L. Santos, M. Gessner
Interferometric Order Parameter for Excited-State Quantum Phase Transitions in Bose-Einstein Condensates
Physical Review Letters **126**, 230602 (2021).
<https://doi.org/10.1103/PhysRevLett.126.230602>
- [39] B. Yadin, M. Fadel, M. Gessner
Metrological complementarity reveals the Einstein-Podolsky-Rosen paradox
Nature Communications **12**, 2410 (2021).
<https://doi.org/10.1038/s41467-021-22353-3>
- [38] Z. Ren, W. Li, A. Smerzi, and M. Gessner
Metrological Detection of Multipartite Entanglement from Young Diagrams
Physical Review Letters **126**, 080502 (2021).
<https://doi.org/10.1103/PhysRevLett.126.080502>
- [37] F. Schlawin*, M. Gessner*, A. Buchleitner, T. Schätz, and S. S. Skourtis
Continuously parametrized quantum simulation of molecular electron transfer reactions
PRX Quantum **2**, 010314 (2021).
<https://doi.org/10.1103/PRXQuantum.2.010314>
*) F.S. and M.G. contributed equally to this work.
- [36] M. Gessner, C. Fabre, and N. Treps
Superresolution limits from measurement crosstalk
Physical Review Letters **125**, 100501 (2020).
<https://doi.org/10.1103/PhysRevLett.125.100501>
- [35] M. Gessner, A. Smerzi, and L. Pezzè
Multiparameter squeezing for optimal quantum enhancements in sensor networks
Nature Communications **11**, 3817 (2020).
<https://doi.org/10.1038/s41467-020-17471-3>
- [34] M. Fadel and M. Gessner
Relating spin squeezing to multipartite entanglement criteria for particles and modes
Physical Review A **102**, 012412 (2020).
<https://doi.org/10.1103/PhysRevA.102.012412>
- [33] L. Pezzè, M. Gessner, P. Feldmann, C. Klempt, L. Santos, and A. Smerzi
Heralded Generation of Macroscopic Superposition States in a Spinor Bose-Einstein Condensate
Physical Review Letters **123**, 260403 (2019).
<https://doi.org/10.1103/PhysRevLett.123.260403>

- [32] H. V. Do*, M. Gessner*, F. S. Cataliotti, and A. Smerzi
Measuring geometric phases with a dynamical quantum Zeno effect in a Bose-Einstein condensate
 Physical Review Research **1**, 033028 (2019).
<https://doi.org/10.1103/PhysRevResearch.1.033028>
 *) H.V.D. and M.G. contributed equally to this work.
- [31] M. Gessner and A. Smerzi
Encrypted Nonlocality: Delayed Choice of Quantum Statistics and other Applications
 EPJ Quantum Technology **6**, 4 (2019).
<https://doi.org/10.1140/epiqt/s40507-019-0074-y>
- [30] M. Gessner
Knowledge of the average energy enhances the metrological sensitivity limit
 Physical Review A **100**, 032114 (2019).
<https://doi.org/10.1103/PhysRevA.100.032114>
- [29] F. Wolf, C. Shi, J. C. Heip, M. Gessner, L. Pezzè, A. Smerzi, M. Schulte, K. Hammerer, and P. O. Schmidt
Motional Fock states for quantum-enhanced amplitude and phase measurements with trapped ions
 Nature Communications **10**, 2929 (2019).
<https://doi.org/10.1038/s41467-019-10576-4>
- [28] M. Gessner, A. Smerzi, and L. Pezzè
Metrological Nonlinear Squeezing Parameter
 Physical Review Letters **122**, 090503 (2019).
<https://doi.org/10.1103/PhysRevLett.122.090503>
- [27] G. Sorelli, M. Gessner, A. Smerzi, and L. Pezzè,
Fast and optimal generation of entanglement in bosonic Josephson junctions
 Physical Review A **99**, 022329 (2019).
<https://doi.org/10.1103/PhysRevA.99.022329>
- [26] Z. Qin*, M. Gessner*, Z. Ren*, X. Deng, D. Han, W. Li, X. Su, A. Smerzi, K Peng
Characterizing the multipartite continuous-variable entanglement structure from squeezing coefficients and the Fisher information
 npj Quantum Information **5**, 3 (2019).
<https://doi.org/10.1038/s41534-018-0119-6>
 *) Z.Q., M.G. and Z.R. contributed equally to this work.
- [25] M. Gessner, L. Pezzè and A. Smerzi
Sensitivity bounds for multiparameter quantum metrology
 Physical Review Letters **121**, 130503 (2018).
<https://doi.org/10.1103/PhysRevLett.121.130503>
- [24] Y. Li*, L. Pezzè*, M. Gessner*, Z. Ren, W. Li, A. Smerzi,
Frequentist and Bayesian Quantum Phase Estimation
 Entropy **20**, 628 (2018).
<https://doi.org/10.3390/e20090628>
 *) Y.L., L.P. and M.G. contributed equally to this work.
- [23] A. Streltsov, H. Kampermann, S. Wölk, M. Gessner, D. Bruß
Maximal Coherence and the Resource Theory of Purity
 New Journal of Physics **20**, 053058 (2018).
<https://doi.org/10.1088/1367-2630/aac484>

- [22] P. Feldmann, M. Gessner, M. Gabbriellini, C. Klempt, L. Santos, L. Pezzè and A. Smerzi
Interferometric sensitivity and entanglement by scanning through quantum phase transitions in spinor Bose-Einstein condensates
Physical Review A **97**, 032339 (2018).
<https://doi.org/10.1103/PhysRevA.97.032339>
- [21] M. Gessner and A. Smerzi
Statistical speed of quantum states: Generalized quantum Fisher information and Schatten speed
Physical Review A **97**, 022109 (2018).
<https://doi.org/10.1103/PhysRevA.97.022109>
- [20] Y. Li*, M. Gessner*, W. Li, and A. Smerzi
Hyper- and hybrid nonlocality
Physical Review Letters **120**, 050404 (2018).
<https://doi.org/10.1103/PhysRevLett.120.050404>
*) Y.L. and M.G. contributed equally to this work.
- [19] M. Gessner and A. Buchleitner
On the reduced dynamics of a subset of interacting bosonic particles
Annals of Physics **390** 192 (2018).
<https://doi.org/10.1016/j.aop.2018.01.013>
- [18] M. Gessner, L. Pezzè, and A. Smerzi
Entanglement and squeezing in continuous-variable systems
Quantum **1**, 17 (2017).
<https://doi.org/10.22331/q-2017-07-14-17>
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 Physical Review A **85**, 052122 (2012).
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 Physical Review Letters **107**, 180402 (2011).
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- [3] M. Gessner and H.-P. Breuer, *Revealing correlations between a system and an inaccessible environment*, In *Advances in Open Systems and Fundamental Tests of Quantum Mechanics*. Springer Proceedings in Physics, vol 237, edited by B. Vacchini, H.-P. Breuer and A. Bassi Springer Nature Switzerland (2019), pp. 59-71
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 Springer International Publishing (2017)
 347 pages
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OTHER PUBLICATIONS

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SPIE Photonics West OPTO Proceedings Vol. 11700, Optical and Quantum Sensing and Precision Metrology; 117002G (2021).
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- [2] M. Gessner, L. Pezzè, and A. Smerzi
Sensitivity Limits for Multiparameter Quantum Metrology
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- [1] M. Gessner
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Diploma Thesis, Albert-Ludwigs-Universität Freiburg (2011).

LIST OF TALKS - OVERVIEW

14 invited talks at international conferences
32 invited seminars and colloquia in universities and research centers
20 contributed talks at international conferences

INVITED TALKS AT INTERNATIONAL CONFERENCES AND WORKSHOPS

- 14 Excited-State Quantum Phase Transitions in Spin-1 Bose-Einstein Condensates
Cold Atom Workshop (CAW) 2025, January 30, 2025
Universitat Politècnica de València, Spain
- 13 Quantum metrology with finite samples: Generalizing the quantum Cramér-Rao bound QUMINOS,
February 14, 2024
Les Diablerets, Switzerland
- 12 Entanglement and Steering in Quantum Metrology
Quantum Correlations of Nature II, Oct. 4, 2023
Siegen, Germany
- 11 Detecting entanglement with tools from metrology
Entanglement in Quantum Fields
[online talk], June 29, 2021, IWH Heidelberg, Germany
- 10 Characterizing quantum correlations of complex quantum states with tools from metrology
International Conference on Complex Quantum Systems (ICCQS-2020)
Bhabha Atomic Research Centre, March 3, 2020, Mumbai, India
- 9 Metrological entanglement detection of non-Gaussian and multimode states
Workshop "Entanglement quantification in cold gases"
Institute for Quantum Optics and Quantum Information (IQOQI), February 3, 2020, Vienna, Austria
- 8 Simulating electron transfer with trapped ions
Quantum Information Processing in Non-Markovian Quantum Complex Systems, Dec. 12, 2019

Nagoya, Japan

- 7 Nonlinear Squeezing Parameter
Quantum Science and Technology Conference & Workshop, Oct 11, 2019
Xi'an, China
- 6 Enhancing the precision of measurements with entanglement
DPG Fall Meeting, Quantum Science and Information Technologies, Sept. 26, 2019
Freiburg, Germany
- 5 Detecting system-environment correlations without accessing the environment
Advances in open systems and fundamental tests of quantum mechanics, Dec. 4, 2018
684. WE-Heraeus-Seminar, Bad Honnef, Germany
- 4 Statistical speed of quantum states: From fundamentals to applications in metrology and entanglement detection
Workshop on Complex and Non-Markovian Quantum Systems, May 14, 2018
Universität Freiburg, Germany
- 3 Enhanced Entanglement Detection with Local Measurements
Workshop on Quantum Metrology, February 2, 2017
Leibniz Universität Hannover, Germany
- 2 Efficient Entanglement Detection for Discrete, Continuous and Hybrid Variables
Gravity in the Lab, August 5, 2016
Benasque, Spain
- 1 Detection of Quantum Discord with Local Operations: Theory and Experiment
Quantum Correlations beyond Entanglement, April 15, 2015
586. WE-Heraeus-Seminar, Bad Honnef, Germany

INVITED COLLOQUIA AND SEMINAR TALKS

- 32 Quantum metrology, uncertainty relations and entanglement
Seminar, March 27, 2025
Universidad de Salamanca, Spain
- 31 Quantum metrology, uncertainty relations and entanglement
Seminar, March 03, 2025
Universidad de Murcia, Spain
- 30 Quantum metrology - from fundamentals to applications
Seminar, February 27, 2024
IFT, Madrid, Spain
- 29 Quantum-enhanced estimation of mode parameters
Seminar, June 20, 2023
[online seminar] CSIC-IFF, Madrid, Spain
- 28 Quantum-enhanced estimation of mode parameters
Seminar, January 25, 2023

Quantum Glue Meetings, UPV/EHU Bilbao, Spain

- 27 Métrologie quantique - fondements théoriques et applications [in French]
Seminar, July 8, 2022
[online seminar] ONERA, Paris, France
Youtube live recording: <https://youtu.be/BE93BqzPZRc>
- 26 Quantum metrology - from fundamentals to applications
Seminar, March 24, 2022
Universidad de Salamanca, Spain
- 25 Detecting multipartite entanglement and EPR steering with tools from metrology
Quantum Information Seminar, November 25, 2021
Universitat Autònoma de Barcelona (UAB), Spain
- 24 Detecting EPR steering and inseparability of local hidden states with tools from metrology
Seminar, November 12, 2021
[online seminar] Nonlocal Seminar Series on Quantum Steering
- 23 Detecting multipartite entanglement and EPR steering with tools from metrology
Seminar, invited by Antonio Acín, September 21, 2021
Institute of Photonic Sciences (ICFO), Barcelona, Spain
- 22 Quantum parameter estimation: From fundamentals to technology
Colloquium, April 21, 2021
[online seminar] Université du Luxembourg
- 21 Quantum parameter estimation: From fundamentals to technology
Colloquium, February 12, 2021
[online seminar] Donostia International Physics Center (DIPC), San Sebastián, Spain
Youtube live recording: <https://youtu.be/XNbl9fXiqZY>
- 20 Quantum parameter estimation: From fundamentals to technology
Group seminar, Tommaso Macrì, November 19, 2020
[online seminar] Universidade Federal do Rio Grande do Norte, Natal, Brazil
- 19 Quantum parameter estimation: From fundamentals to technology
Colloquium, October 1st, 2020
[online seminar] University of Bonn, Germany
- 18 Quantum parameter estimation: From fundamentals to technology
Group Seminar, Dieter Jaksch, July 2, 2020
[online seminar] University of Oxford, UK
- 17 Squeezing revisited: Non-Gaussian states and multiparameter estimation
Physics Colloquium, May 28, 2020
[online seminar] University of Warsaw, Poland
- 16 Quantum parameter estimation: From fundamentals to technology
Colloquium, May 26, 2020
[online seminar] Institute of Theoretical Physics (IPhT), CEA, Saclay, France

- 15 Metrological Entanglement Detection with Higher Moments
Group seminar, Otfried Gühne, April 25, 2019
Universität Siegen, Germany
- 14 Quantum metrology and quantum correlations
Conference of the Physics Department, November 9, 2018
École Normale Supérieure, Paris, France
- 13 Entanglement and Sensitivity in Multiparameter Quantum Metrology
Quantum Information Seminar, October 11, 2018
University of Warsaw, Poland
- 12 Entanglement and Sensitivity in Multiparameter Quantum Metrology
Seminar, October 9, 2018
Gdańsk University of Technology, Poland
- 11 Entanglement in Multiparameter Quantum Metrology
Group seminar, Jakob Reichel, June 28, 2018
École normale supérieure, Paris, France
- 10 Interferometric sensitivity and entanglement with discrete and continuous variables
Seminar, October 10, 2017
Laboratoire Kastler Brossel, UPMC, Paris, France
- 9 Witnessing entanglement in discrete and continuous-variable systems
Seminar, August 28, 2017
State Key Laboratory of Quantum Optics, Taiyuan, China
- 8 Quantum Correlations under Multipartite Collective Dephasing
LENS and QSTAR Colloquium, October 23, 2015
Laboratory for Non-Linear Spectroscopy (LENS), Florence, Italy
- 7 Dynamical Characterization of Controllable Quantum Systems
LENS and QSTAR Colloquium, May 26, 2015,
Laboratory for Non-Linear Spectroscopy (LENS), Florence, Italy
- 6 Detection of Quantum Discord with Local Operations: Theory and Experiment
Group seminar, Rosario Fazio and Vittorio Giovannetti, February 24, 2015,
Scuola Normale Superiore, Pisa, Italy
- 5 Quantum Correlations under Multipartite Correlated Dephasing
Group seminar, Dagmar Bruß, December 17, 2014
Heinrich-Heine-Universität Düsseldorf, Germany
- 4 Quantum Phase Transition and Single-Spin Signatures of Quantum Correlations
Group seminar, Tobias Brandes, June 23, 2014
Technische Universität Berlin, Germany
- 3 Local Detection of Quantum Correlations with a Trapped Ion
Group seminar, Shaul Mukamel, May 13, 2013
University of California, Irvine, USA

- 2 Local Detection of Quantum Correlations in Open Systems
AMO Colloquium, January 18, 2012
University of California, Berkeley, USA
- 1 Local Detection of Quantum Correlations in Open Systems
Colloquium Theoretical Physics, May 10, 2012
Carl von Ossietzky Universität Oldenburg, Germany

CONTRIBUTED TALKS AT INTERNATIONAL CONFERENCES

- 21 Hierarchies of quantum metrology bounds beyond Cramér-Rao
Quantum Information in Spain (ICE-9), Noviembre 13, 2024
Puerto de la Cruz, Tenerife, Spain
- 20 Hierarchies of quantum metrology bounds beyond Cramér-Rao
QUANTUMatter 2024, May 8, 2024
San Sebastián, Spain
- 19 Quantum Metrology with non-Gaussian Spin States,
Quantum Information in Spain (ICE-8), May 30, 2023
Santiago de Compostela, Spain
- 18 Quantum Metrology with non-Gaussian Spin States,
QUANTUMatter 2023, May 24, 2023
Madrid, Spain
- 17 Revealing the Einstein-Podolsky-Rosen paradox with tools from metrology,
Quantum Information in Spain (ICE-7), May 26, 2022
Granada, Spain
- 16 Quantum enhancements in multiparameter metrology: From squeezing to non-Gaussian states,
Quantum Technology International Conference (QTech) 2020, November 2, 2020
[online conference] Barcelona, Spain
- 15 Nonlinear Spin Squeezing
12th Italian Quantum Information Science Conference, September 11, 2019
Milano, Italy
- 14 Sensitivity Limits for Multiparameter Quantum Metrology
Quantum Information and Measurement (QIM) V Quantum Technologies, April 6, 2019
Rome, Italy
- 13 Precision measurements, entanglement and squeezing with continuous-variable systems
25th Central European Workshop on Quantum Optics, May 23, 2018,
University of the Balearic Islands, Palma de Mallorca, Spain
- 12 Entanglement Detection for Discrete, Continuous and Hybrid Variables (*)
9th Italian Quantum Information Science Conference, September 23, 2016,
Rome, Italy
(*) winner of the "Best talk award" (prize value: 500,00 €)

- 11 Behavior of the Excitation Spectrum During a Quantum Phase Transition:
Semiclassical Approach
Excited-State Quantum Phase Transitions, September 23, 2015
ECT*, Trento, Italy
- 10 Role of the Excitation Spectrum During a Quantum Phase Transition:
Semiclassical Approach
Dynamics of Complex Quantum Systems, August 5, 2015
Cumberland Lodge, Windsor, England
- 9 Role of the Excitation Spectrum During a Quantum Phase Transition:
Semiclassical Approach
German Physical Society (DPG) Spring Meeting, March 27, 2015
Heidelberg, Germany
- 8 Probing Non-Equilibrium Phenomena in Controllable Quantum Systems
with Nonlinear Spectroscopy
Quantum Many-Body Systems far from Equilibrium, March 9, 2015
Stellenbosch Institute for Advanced Studies, Stellenbosch (STIAS), South Africa
- 7 Quantum Correlations under Multipartite Collective Dephasing
Extreme Atomic Systems, February 16, 2015
Riezlern, Austria
- 6 Nonlinear Spectroscopy of Trapped Ions
German Physical Society (DPG) Spring Meeting, March 20, 2014
Berlin, Germany
- 5 Local Detection of Quantum Correlations with a Single Trapped Ion,
Entanglement detection and quantification, March 10, 2014
Bilbao, Spain
- 4 Local Detection of Quantum Correlations with a Trapped Ion,
Extreme Atomic Systems, February 5, 2014
Riezlern, Austria
- 3 Generic Features of Complex Open Quantum Systems,
Gathering on Open Systems: Classical and Quantum, December 13, 2013
Universidad Nacional Autónoma de México, Cuernavaca, Mexico
- 2 Local Detection of Quantum Correlations with a Trapped Ion
DAMOP Spring Meeting of the American Physical Society (APS), June 7, 2013
Quebec City, Canada
- 1 Local Detection of Quantum Correlations in Open Systems
Photosensitive Processes in Nature and Technology, September 19, 2011
Capri, Italy

OTHER COLLOQUIA AND SEMINAR TALKS

- 21 Hierarchies of quantum metrology bounds beyond Cramér-Rao

Quantum Spain Mini-Workshop, ETSE, Universidad de Valencia, May 13, 2024

- 20 Quantum metrology: From fundamentals to applications
IFIC Seminar, IFIC, Universidad de Valencia, October 10, 2022
- 19 Non-Gaussian spin squeezing
ICFO-DTU Workshop, Castelldefels, November 22, 2021
- 18 Nonlinear spin squeezing
10th Basel-Paris atom chips workshop, École Normale Supérieure, Paris, June 7, 2019
- 17 Nonlinear spin squeezing
Cold atoms seminar, Laboratoire Kastler Brossel, Paris, May 9, 2019
- 16 Entanglement Detection for Discrete, Continuous and Hybrid Variables
Seminar, May 30, 2016
Istituto Nazionale di Ricerca Metrologica (INRiM), Torino, Italy
- 15 The Fisher information: From quantum-enhanced precision measurements to entanglement detection
Group seminar, Andreas Buchleitner, October 7, 2016
Albert-Ludwigs-Universität Freiburg, Germany
- 14 Quantum Correlations under Multipartite Collective Dephasing
Colloquium for Chaos and Quantum Information, Karol Życzkowski, June 1, 2015
Jagiellonian University, Krakow, Poland
- 13 Role of the Excitation Spectrum During a Quantum Phase Transition:
Semiclassical Approach
Colloquium of the Atomic Physics Department, Jakub Zakrzewski, June 1, 2015
Jagiellonian University, Krakow, Poland
- 12 Quantum Correlations under Multipartite Collective Dephasing
NITheP Quantum Group Seminar, March 6, 2015
University of KwaZulu-Natal, Durban, South Africa
- 11 Quantum Correlations under Multipartite Collective Dephasing
Colloquium of the National Laser Centre, March 3, 2015
CSIR, Pretoria, South Africa
- 10 Nonlinear Spectroscopy of Trapped Ions
Workshop in the group of Christoph Lienau, October 15, 2014
Carl von Ossietzky Universität Oldenburg, Germany
- 9 Nonlinear Spectroscopy of Controllable Many-Body Quantum Systems
Group seminar, Andreas Buchleitner, June 4, 2014
Albert-Ludwigs-Universität Freiburg, Germany
- 8 Local Detection of Quantum Correlations and Nonlinear Spectroscopy
Workshop in the groups of Thomas Ebbesen and Guido Pupillo, March 27, 2014
Université de Strasbourg, France
- 7 Trapped Ion Experiments and the Detection of Quantum Correlations
Group seminar, Andreas Buchleitner, November 6, 2013

Albert-Ludwigs-Universität Freiburg, Germany

6 Local Detection of Quantum Correlations in Open Systems

Group seminar, Andreas Buchleitner, May 7, 2012

Albert-Ludwigs-Universität Freiburg, Germany

5 Local Detection of Quantum Correlations in Open Systems

Group seminar, Juan Pablo Paz, March 12, 2012

Universidad de Buenos Aires, Buenos Aires, Argentina

4 Local Detection of Quantum Correlations in Open Systems

Quantum Efficiency Seminar, January 24, 2012

Freiburg Institute for Advanced Studies (FRIAS), Germany

3 Dynamical Features of Generic Open Quantum Systems: A Statistical Approach Based on Averages on the Unitary Group

Group seminar, Jyrki Piilo, November 24, 2011

Turku Centre for Quantum Physics, University of Turku, Finland

2 Local Detection of Quantum Correlations in Open Systems

Group seminar, Jyrki Piilo, November 22, 2011

Turku Centre for Quantum Physics, University of Turku, Finland

1 Local Detection of Quantum Correlations in Open Systems

Seminar, July 22, 2011

Freiburg Institute for Advanced Studies (FRIAS), Germany

POSTER PRESENTATIONS (SELECTION)

7 Sensitivity bounds on multiparameter metrology

April 8, 2019, 13th European Conference on Atoms Molecules and Photons (ECAMP13), Florence, Italy

6 Enhanced Entanglement Detection with Local Measurements

Quantum Science Approaches to Strongly Correlated Systems

May 30, 2017, Galileo Galilei Institute for Theoretical Physics, Firenze, Italy

5 Role of the Excitation Spectrum During a Quantum Phase Transition: Semiclassical Mean-Field Approach

7th Workshop on Quantum Chaos and Localisation Phenomena,

May 30, 2015, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland

4 Local Detection of Quantum Correlations with Trapped Ions

School and Workshop on Quantum Information

August 15, 2013, Paraty, Brasil

3 Local Detection of Quantum Correlations with Trapped Ions

DAMOP Conference of the American Physical Society (APS)

June 5, 2013, Quebec City, Canada

2 Local Detection of Quantum Correlations with Trapped Ions

SQInT Workshop

February 21, 2013, Center for Quantum Information and Control, Santa Barbara, USA

- 1 Dynamical Features of Generic Open Quantum Systems: A Statistical Approach Based on Averages over the Unitary Group

Andrejewski Day: The mathematics of quantum transport

May 18, 2012, Albert-Ludwigs-Universität Freiburg, Germany

FIRMA

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(*) ai sensi dell'art. 15, comma 1 della Legge 12/11/2011, n. 183 le certificazioni rilasciate dalla P.A. in ordine a stati, qualità personali e fatti sono valide e utilizzabili solo nei rapporti tra privati; nei rapporti con gli Organi della Pubblica Amministrazione e i gestori di pubblici servizi, i certificati sono sempre sostituiti dalle dichiarazioni sostitutive di certificazione o dall'atto di notorietà di cui agli artt. 46 e 47 del DPR 445/2000