Guido Pagano

Personal Data

email: pagano@rice.edu Address: 6100 Main St., Houston, TX 77005

Appointments

2019 - present	**Assistant Professor**, *Rice University*
2019	**Visiting Scholar**, *Oxford University*
2018 - 2019	**Faculty Research Scientist**, *Joint Quantum Institute* and *University of Maryland*
2015 - 2018	**Intelligence Community Postdoc**, *Joint Quantum Institute, ORAU*, and *University of Maryland* Advisor: Prof. Christopher Monroe

Education

2011-2015	**Ph.D.**, *Scuola Normale Superiore*, Pisa, and *LENS*, Florence, Italy 70/70 *cum laude* | Advisors: Prof. M. Inguscio & Prof. R. Fazio, **Thesis: "Many-body physics with Ytterbium Fermi gases in optical lattices: from one-dimensional systems to orbital magnetism"**
2009- 2011	**Master's Degree in Physics**, *Universitá La Sapienza di Roma*, Italy 110/110 *cum laude* | Advisors: Prof. M. Inguscio & Prof. P. Mataloni Thesis: *Laser Cooling of Atomic Ytterbium*
2006 - 2009	**Undergraduate Degree in Physics**, *Universitá degli Studi di Milano*, Italy 110/110 *cum laude* | Supervisor: Prof. N. Manini Thesis: *"Bogolioubov-De Gennes normal-modes analysis of a cylindrically symmetric Bose-Einstein condensate"*
2003 - 2006	**Undergraduate Degree in Economics**, *Universitá Bocconi di Milano*, Italy 110/110 *cum laude* (the youngest student of the year to get this mention) Thesis: *"Joint Liability in Microfinance"* | Supervisor: Prof. E. La Ferrara Exchange program: **New York University**

Grants

2020 - present	**DOE DE-SC0021143**, $775,000 (co-PI). "Approaching QCD with Quantum Simulators and Quantum Computers"
2020 - present	**ARMY STTR - A20B-T009-0076 - Phase I**, $161,000 (co-PI). "Advanced Monolithic 3D ion trap for Quantum Sensing and Information Processing"

2020 - present	**ONR N00014-20-1-2695**, $621,000 (PI). "Variational Optimization with Trapped-Ion Quantum Hardware"
2020 - 2020	**ARL SBIR - W911QX20P0063 - Phase I**, $167,000 (co-PI). "Compact, room-temperature, high-optical access 3D ion trap for quantum entanglement".
2017 - 2018	**NSF Physics Frontier Center Seed Project**, $50,000 (PI). "New Directions in Many-body Physics and Quantum Computing enabled by EIT cooling".

Patents

2019	U.S. Patent Application SN 16/677, 922: "Heisenberg Scaler", Inventors: A. V. Gorshkov, J. Porto, Z. Eldredge, K. Qian, W. Ge, G.Pagano, and C. Monroe
2018	U.S. Patent 16408151: "Cryogenic Trapped-Ion System" Inventors: C.Monroe, G.Pagano, P.W. Hess, H. Kaplan, W. L. Tan, and P. Richerme

Referee/Reviewer:

Referee	Nature Science Physical Review Letters New Journal of Physics Review of Scientific Instruments Journal of Physics B: Atomic, Molecular and Optical Physics Quantum Science and Technology

Teaching Experience

2021	Phys 104, Electromagnetism, Rice University.
2020	Phys 126, Electromagnetism for Pre-Med Undergraduates, Rice University.
2015	Electromagnetism, Teaching Assistant, University of Florence.
2016-	Mentored 9 graduate and 4 undergraduate students, University of Maryland and Rice University
2014	Outreach for high school students at LENS, University of Florence.

Scholarships, Certificates and Awards

2019	**Best Invention of the Year UMD Award**: A Cryogenic Ion Trapping and Storage System for Quantum Information Processing
2015 - 2017	**Intelligence Community Postdoctoral Fellowship**, ORAU
2014	**Young Scientists Award**: "Giuseppe Franco Bassani Award" from Società Italiana Fisica.
2014	**Poster Award** at YAO conference in Barcelona.
2011	**Scholarship** within the **Excellent students program** at Università La Sapienza with the thesis: *"Fermi Hubbard Model and Metal-Insulator transition induced by correlations"* | Supervisor: Prof. Carlo Di Castro.

List of Publications

>2800 Citations on Google Scholar

"Observation of a prethermal discrete time crystal"
A. Kyprianidis, F. Machado, W. Morong, P. Becker, K. S. Collins, D. V. Else, L. Feng, P. W. Hess, C. Nayak, G. Pagano, N. Y. Yao, C. Monroe, *Science (accepted)* (2021)

"Domain Wall Confinement and Dynamics in a Quantum Simulator"
W. L. Tan, P. Becker, F. Liu, G. Pagano, K. S. Collins, A. De, L. Feng, H. B. Kaplan, A. Kyprianidis, R. Lundgren, W. Morong, S. Whitsitt, A. V. Gorshkov, C. Monroe, *Nature Physics (in press)* (2021).

"Programmable Quantum Simulations of Spin Systems with Trapped Ions"
C. Monroe, W. C. Campbell, L.-M. Duan, Z.-X. Gong, A.V. Gorshkov, P. Hess, R. Islam, K. Kim, G. Pagano, P. Richerme, C. Senko, N.Y. Yao, *Review of Modern Physics (accepted)* (2021).

"Quantum Approximate Optimization with a Trapped-Ion Quantum Simulator"
G. Pagano, A. Bapat, P. Becker, K. S. Collins, A. De, P. W. Hess, H. B. Kaplan, A. Kyprianidis, W. L. Tan, C. Baldwin, L. T. Brady, A. Deshpande, F. Liu, S. Jordan, A. V. Gorshkov, C. Monroe, *Proc. Natl. Ac. Sci.* **117**, *25396 (2020)*.

"Many-Body Dephasing in a Trapped-Ion Quantum Simulator"
H. B. Kaplan, L. Guo, W. L. Tan, A. De, F. Marquardt, G. Pagano, C. Monroe, *Phys. Rev. Lett.*, **125**, 120605 (2020).

"Efficient ground-state cooling of large trapped-ion chains with an EIT tripod scheme"
L. Feng, W. L. Tan, A. De, A. Menon, A.Chu, G. Pagano, C. Monroe, *Phys. Rev. Lett.* 125, 053001 (2020).

"Towards analog quantum simulations of lattice gauge theories with trapped ions"
Z. Davoudi, M. Hafezi, C. Monroe, G. Pagano, A. Seif, A. Shaw, *Phys. Rev. Res.*, 2, 023015 (2020).

"Heisenberg-Scaling Measurement Protocol for Analytic Functions with Quantum Sensor Networks"
K. Qian, Z. Eldredge, W. Ge, G. Pagano, C. Monroe, J. V. Porto, A. V. Gorshkov, *Phys. Rev. A* **100**, 042304 (2019)

"Confined Dynamics in Long-Range Interacting Quantum Spin Chains"
F. Liu, R. Lundgren, P. Titum, G. Pagano, J. Zhang, C. Monroe, A. V. Gorshkov, *Phys. Rev. Lett.* **122**, 150651, (2019)

"Fast and scalable quantum information processing with two-electron atoms in optical tweezer arrays "
G. Pagano, F.Scazza, M. Foss-Feig, *Adv. Quantum Technol.* **2**, 1800067 (2019), front cover.

“Cryogenic trapped-ion system for large scale quantum simulation”
G. Pagano, P. W. Hess, H. B. Kaplan, W. L. Tan, P. Richerme, P. Becker, A. Kyprianidis, J. Zhang, E. Birckelbaw, M. R. Hernandez, Y. Wu and C. R. Monroe, *Quantum Science and Technology* **4**, *014004* (2018).

“Chiral spin currents in a trapped-ion quantum simulator using Floquet engineering”
T.Grass, A. Celi, G. Pagano, M. Lewenstein, *Phys. Rev. A* **97**, *010302(R),* (2018).

“Observation of a many-body dynamical phase transition with a 53-qubit quantum simulator”
J. Zhang, G. Pagano, P. W. Hess, A. Kyprianidis, P. Becker, H. Kaplan, A. V. Gorshkov, Z.-X. Gong, C. Monroe, *Nature* **551**, 601-604, (2017).

“Non-thermalization in trapped atomic ion spin chains”
P. W. Hess, P. Becker, H. B. Kaplan, A. Kyprianidis, A. C. Lee, B. Neyenhuis, G. Pagano, P. Richerme, C. Senko, J. Smith, W. L. Tan, J. Zhang, C. Monroe, *Phil. Trans. R. Soc. A* **375**: 20170107 (2017).

“Observation of a discrete time crystal”
J. Zhang, P. W. Hess, A. Kyprianidis, P. Becker, A. Lee, J. Smith, G. Pagano, I.-D. Potirniche, A. C. Potter, A. Vishwanath, N. Y. Yao, C. Monroe, *Nature* **543** 217-220, (2017), front cover.

“Measuring absolute frequencies beyond the GPS limit via long-haul optical frequency dissemination”
C. Clivati, G. Cappellini, L. Livi, F. Poggiali, M. Siciliani de Cumis, M. Mancini, G. Pagano, M. Frittelli, A. Mura, G. A. Costanzo, F. Levi, D. Calonico, L. Fallani, J. Catani, M. Inguscio, *Optics Express* **24**, 11865 (2016).

“A strongly interacting gas of two-electron fermions at an orbital Feshbach resonance”
G. Pagano, M. Mancini, G. Cappellini, L. Livi, C.Sias, J. Catani, M. Inguscio, L. Fallani, *Phys. Rev. Lett.* **115**, 265301 (2015).

“A compact ultranarrow high-power laser system for experiments with 578 nm Ytterbium clock transition”
G. Cappellini, P. Lombardi, M. Mancini, G. Pagano, M. Pizzocaro, L. Fallani, J. Catani, *Review of Scientific Instruments* **86**, 073111 (2015).

“Observation of chiral edge states with neutral fermions in synthetic Hall ribbons”
M. Mancini, G. Pagano, G. Cappellini, L. Livi, M. Rider, J. Catani, C. Sias, P. Zoller, M. Inguscio, M. Dalmonte, L. Fallani, *Science* **349**, 1510 (2015).

“Direct observation of coherent inter-orbital spin-exchange Dynamics”
G. Cappellini, M. Mancini, G. Pagano, P. Lombardi, L. Livi, M. Siciliani de Cumis, P. Cancio, M. Pizzocaro, D. Calonico, F. Levi, C. Sias, J. Catani, M. Inguscio, and L. Fallani, *Phys. Rev. Lett.* **113**, 120402 (2014).

“A one dimensional liquid of fermions with tunable spin”
G. Pagano, M. Mancini, G. Cappellini, P. Lombardi, F. Schäfer, H. Hui, X. J. Liu, J. Catani, C. Sias, M. Inguscio and L. Fallani, *Nature Phys.* **10**, 198 (2014).

Preprints

“Observation of Stark many-body localization without disorder”
W. Morong, F. Liu, P. Becker, K. S. Collins, L. Feng, A. Kyprianidis, G. Pagano, T. You, A. V. Gorshkov, C. Monroe, *arXiv 2102.07250* (2021)

Invited Talks

2021 Invited Virtual Talk, **Adiabatic Quantum computing**
2021 Invited Virtual Colloquium, **University of Houston**
2021 Invited Virtual Tutorial, **March Meeting**
2020 Invited Virtual Seminar, **Natal University**
2020 Invited Virtual Talk, **ICTP/MPIPKS Virtual workshop**
2020 Invited Talk, **SIAMPP20 Conference**, Seattle
2019 Invited Seminar, **ICTP**, Trieste, Italy
2019 Colloquium, **Geneva University**, Switzerland
2019 Invited Seminar, **Florence University & Lens**, Italy
2019 Colloquium, **Oxford University, UK**
2019 Invited talk, **QSC** Quantum Simulation and Computation, Madrid
2019 Invited talk, **NEQ** Many facets of non-equilibrium physics, Mazara del Vallo, Italy.
2019 Invited talk, Breakdown of Ergodicity in isolated quantum systems, **GGI**, Florence.
2019 Invited talk, **QIMV OSA** conference, Rome, Italy.
2019 Colloquium, **Iowa University**, Iowa City.
2019 Invited talk, **APS** March meeting, Boston.
2019 Invited seminar, **University of Illinois**, Urbana-Champaign.
2019 Invited seminar, **University of Colorado and JILA**, Boulder.
2019 Invited seminar, **MIT**, Boston.
2019 Invited seminar, **Harvard**, Boston.
2019 Invited seminar, **Penn State University**, University College.
2019 Invited seminar, **Rice University**, Houston.
2018 Invited talk, Anderson Localization and Interaction Conference, **MPI-PKS**, Dresden.
2018 Invited seminar, **IQOQI**, Innsbruck, Austria.
2018 Colloquium, Karlsruhe Institute of Technology **(KIT)**, Karlsruhe, Germany.
2018 Invited talk, Quantum Science, **Gordon Research Seminar**, Easton.
2018 Invited talk, Correlated electron systems, **Gordon Conference**, Mount Holyoke College.
2018 Invited talk, Quantum Dynamics of Disordered Interacting Systems, **ICTP**, Trieste.
2018 Invited talk, Spring Meeting 2018, **DPG**, Erlangen.
2018 Invited talk, Quantum Simulation and Computation, **Ikerbasque**, Bilbao.
2017 Invited talk, Long range Workshop, **Sao Carlos University**, Sao Carlos.
2017 Invited talk, Long range Workshop, **DPG**, Bad-Honnef.
2017 Invited seminar, **ETH**, Zurich.
2016 Invited seminar, **LENS**, Florence.
2016 Invited talk, NCTS Annual Meeting 2016, **National Tsing Hua University**, Taiwan.
2015 Invited talk, Topological and Correlated Phases in Cold Atoms, **Princeton University**.
2014 Invited talk, Probing and Understanding Exotic Superconductors, **ICTP**, Trieste.
2014 Invited talk, Quantum gases and Quantum Coherence, **BEC 2014**, Levico (Trento).
2014 Conference, **ICAP**, Washington DC (**Poster**).

2014 Conference, **YAO 2014**, Young Atom-Opticians Conference, Barcelona, (**Poster**).
2013 Conference, **QIPC 2013**, Florence (**Poster**).
2012 Workshop, **Quantum Simulation with Ultracold atoms**, ICTP, Trieste, (**Poster**).
2011 DPG School of Physics, Bad Honnef, (**Poster**).
2010 Summer PreDoc School, **INTERCAN & IFRAF**, UltraCold Atoms, Metrology and Quantum Optics, École de Physique Les Houches, France, (**Poster**).

Languages

Native Speaker	Italian
Fluent	English
Basic Knowledge	French