Enrico Prati
CURRICULUM VITAE

POSIZIONI LAVORATIVE PRECEDENTI E IN CORSO

2/2002- 3/2003	RICERCATORE TEMPO DETERMINATO PRESSO ISTITUTO INFORMATICA E TELEMATICA -CNR PISA
3/2003 – 10/2006	ASSEGNO DI RICERCA PRESSO ISTITUTO NAZIONALE DI FISICA DELLA MATERIA AGRATE BRIANZA (MB)
10/2006 – 9/2009	RICERCATORE TD INFM-CNR E ISTITUTO MICROELETTRONICA E MICROSISTEMI -CNR AGRATE BRIANZA
9/2009 – 11/2019	RICERCATORE TEMPO INDETERMINATO PRESSO IMM-CNR AGRATE BRIANZA E IFN -CNR MILANO
11/2019 -1/2022	PRIMO RICERCATORE TI PRESSO ISTITUTO DI FOTONICA E NANOTECNOLOGIE –CNR MILANO
2/2022- IN CORSO	PROFESSORE ASSOCIATO PRESSO DIPARTIMENTO DI FISICA – UNIVERSITÀ DEGLI STUDI DI MILANO

ATTIVITA' SCIENTIFICA - SINTESI

Il Dott. Enrico Prati è attualmente Professore Associato presso il Dipartimento di Fisica dell'Università degli Studi di Milano ed è associato all'Istituto di Fotonica e Nanotecnologie del Consiglio Nazionale delle Ricerche a Milano. La sua attività di ricerca riguarda lo studio teorico della fisica dei dispositivi quantistici a stato solido con particolare riferimento ai sistemi fortemente correlati e al controllo degli stati quantistici principalmente nei dispositivi di silicio per la computazione quantistica, e il loro controllo e impiego mediante deep learning e quantum machine learning, con una forte connessione con gli esperimenti.

Il principale interesse è stato rivolto ai dispositivi quantistici in silicio per la progettazione di esperimenti di fisica fondamentale e applicazioni basati su sistemi di elettroni confinati da uno a pochi atomi di drogante nel silicio o mediante difetti o mediante pozzi quantici a pochi elettroni/lacune, il design di porte logiche quantistiche basate su tali dispositivi a stato solido mediante algoritmi genetici e di deep learning, la modellizzazione di trasporto di stati quantistici e compilazione quantistica basate su deep leraning, loro impiego per supportare algoritmi di quantum machine learning.

HIGHLIGHTS

EP ha pubblicato 67 articoli su rivista peer reviewed tra cui Nature Nanotechnology [IF 31.5], Advanced Functional Materials [IF 16.8], Nanoscale [IF 8.9], npj Quantum Information [IF 7.3] e la rivista di Nature Communication Physics [IF 4.7], di cui 20 come primo autore, 27 come ultimo autore e 5 come unico autore. e 33 proceedings di conferenza, oltre che 9 capitoli di libro e un libro come Editor. Ha un H-index pari a 20 (Scopus) e 23 (Scholar) con un totale di >1100 distinte citazioni (Scopus e WoS) e >1300 (Scholar).

E' stato Keynote speaker a IEDM nel 2014 e TEDx speaker nel 2016.

Organizza o ha organizzato il Workshop DICE (6 edizioni), il Workshop HPC and quantum computing (3 edizioni), il Workshop Quantum Security di ITASEC21 e 4 workshop bilaterali Italia-Giappone.

E' stato chiamato come membro nell'Advisory Board del CRS4 e dell'Osservatorio Tecnologie Quantistiche del Politecnico di Milano.

E' stato titolare del corso 'Quantum Artificial Intelligence" per il Dottorato in Fisica del Politecnico di Milano.

Ha coordinato progetti bilaterali con il Giappone (MAE) e Taiwan (CNR&NSC), `stato vicecoordinatore di progetti di rilevanza nazionale ed è Principal Investigator del progetto QUASIX (www.quasix.space) finanziato dall'Agenzia Spaziale Italiana. E' stato Workpackage leader di progetti Europei e nazionali.

TITOLI

TITOLI DI STUDIO

Laurea in Fisica Teorica, titolo “Studio delle funzioni di critical crossover scaling dei modelli a simmetria O(N) a d=3”, Relatore Paolo Rossi, Corso di Laurea in Fisica, Università degli Studi di Pisa, 30 Ottobre 1998

Dottorato di Ricerca in Fisica, titolo. “Resonance methods for the microave Hall mobility in semiconductors” Supervisor: Massimo Martinelli, Università degli Studi di Pisa, 3 Ottobre 2002

ALTRI TITOLI CONSEGUITI E CONCORSI VINTI

DIPLOMA DI MATURITA’

Diploma di Maturità´Scientifica Liceo Scientifico G. Marconi Parma Votazione 60/60 Luglio 1993

ABILITAZIONI E IDONEITA’

Abilitazione Scientifica Nazionale per la prima fascia nel settore 02B2 Fisica Teorica delle Materia conseguita 8 Luglio 2020

Abilitazione Scientifica Nazionale per la prima fascia nel settore 02B1 Fisica Sperimentale della Materia conseguita il 15 Gennaio 2020

Idoneità a Dirigente di Ricerca-I livello del Consiglio Nazionale delle Ricerche Bando 315.41 DR come da Graduatoria del 23/12/2020

Abilitazione Scientifica Nazionale per la seconda fascia nel settore 02B2 Fisica Teorica delle Materia conseguita 8 Luglio 2020

Abilitazione Scientifica Nazionale per la seconda fascia 02B1 Fisica Sperimentale della Materia conseguita il 12 Aprile 2017

ATTIVITÀ DIDATTICA

INSEGNAMENTI E MODULI

CORSI TENUTI

Anno Accademico 2013-2014 Politecnico di Milano – Incarico di Esercitazioni presso Politecnico di Milano - Fondamenti di Fisica Sperimentale I (INTEGR.) 2 semestre 40 ore

Anno Accademico 2018-2019 Politecnico di Milano – Corso di Dottorato in Fisica - Quantum Artificial Intelligence 5 CFU 25 ore

Anno Accademico 2019-2020 IUSS Pavia – Corso seminariale – Introdution to Quantum Artificial Intelligence – 10 ore

Anno Accademico 2020-2021 Politecnico di Milano – Corso di Dottorato in Fisica - Quantum Artificial Intelligence – 25 ore

ALTRE DOCENZE PRESSO SCUOLE NAZIONALI E SCUOLE DI DOTTORATO

Anno 2007 - Incarico di Insegnamento presso INSTM XIII Scuola Nazionale di Scienza dei Materiali, Giornata su Caratterizzazione dei nanosistemi: V modulo - “Trasporto di carica e spin in nanostrutture”, Bressanone, 30 Settembre - 9 Ottobre 2007

A.A. 2008-2009 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano “Caratterizzazione elettrica di strutture nanoscopiche: metodi e strumentazione elettronica”, 5-7 Novembre 2008

A.A. 2010-2011 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano “Electrical characterisation of nanoscale samples & biochemical interfaces: methods and electronic instrumentation”, 16-19 Novembre 2010

A.A. 2012-2013 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano “Electrical characterisation of nanoscale samples & biochemical interfaces: methods and electronic instrumentation”, 19-23 Novembre 2012

A.A. 2014-2015 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano "Electrical characterisation of nanoscale samples & biochemical interfaces: methods and electronic instrumentation", 24-28 Novembre 2014

A.A. 2016-2017 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano "Electrical characterisation of nanoscale samples & biochemical interfaces: methods and electronic instrumentation", 21-25 Novembre 2016

A.A. 2017-2018 - Incarico di insegnamento presso Master in “Digital Forensics e Tecnologie Cyber”- Scuola delle Telecomunicazioni Forze Armate in Chiavari-Stato Maggiore Difesa, “Uno sguardo internazionale alla cyber security”, Chiavari 8 Marzo 2018

A.A. 2018-2019 - Incarico di insegnamento presso Master Sicurezza – Link Campus University su “Intelligenza artificiale: opportunità e rischi”, 7 Febbraio 2019

A.A. 2018-2019 - Incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano "High Resolution Electronic Measurements in Nano-Bio Science", 8-12 Aprile 2019

Anno 2019 - Responsabile Scientifico del Corso di una giornata “Programmazione di algoritmi e intelligenza artificiale su computer quantistici”, Milano, Italia organizzato da Vista Technology SRL, 19 Settembre 201 e incarico di Insegnamento delle lezioni “Introduction to quantum computers” e “Introducion to Artificial Intelligence”, 19 Settembre 2019

A.A. 2020-2021 - Attribuzione dell’incarico di Insegnamento presso Politecnico di Milano Scuola di Dottorato Politecnico di Milano Advanced PhD course on "High Resolution Electronic Measurements in Nano-Bio Science", previsto per i giorni 7-18 Giugno 2021

ATTIVITÀ DI DIDATTICA INTEGRATIVA E DI SERVIZIO AGLI STUDENTI

ATTIVITÀ DI RELATORE DI ELABORATI DI LAUREA, DI TESI DI LAUREA MAGISTRALE, DI TESI DI DOTTORATO E DI TESI DI SPECIALIZZAZIONE

Il Dott. Enrico Prati è relatore di 3 Dottorati di Ricerca industriali, 23 Tesi Magistrali e 5 Tesi Triennali. A partire dal 2018, si contano 12 Tesi Magistrali, le tre Tesi di Dottorato e 2 Tesi Triennali, per un totale di 17, riguardanti l'emergente ambito del quantum machine learning, del deep learning e dei computer quantistici, mentre 3 tesi magistrali hanno riguardato spiking neurons artificiali. EP è stato oppure è opponent di 4 tesi di dottorato.

SEMINARI (per workshop e conferenze si veda in seguito la sezione Ricerca)

RELATORE

1. E. Prati "Random Telegraph signal in MOSFET devices", Hitachi Cambrdige Seminar, 8 Ottobre 2006
2. E. Prati, "A Lab in a silicon chip: Single Atom Based Nanoelctronics and THz applications", Consorzio Nazionale Internuiversitario delle Telecomunicazioni, Pisa 18 Gennaio 2011
3. E. Prati, "Emerging physics in single electron and single atom devices", INFN Frascati 12 Ottobre 2011
4. E. Prati, "P-monolayer deterministic doping of silicon for THz applications"; Tsingh Hua Uniersity, Hsinchu, Taiwan, Dicembre 2011
5. E. Prati, "Emerging physics in single electron and single atom devices", NSC Hsinchu Taiwan Dicembre 2011
6. E. Prati, "Silicon nanoelectronic devices based on few donors", Seminario presso CNR-IMM Catania, 28 Settembre 2012
7. E. Prati, "Silicon nanoelectronic devices based on few donors" Seminari INFN Sez. Firenze, Firenze 31 Ottobre 2012
8. E. Prati, "Experimental breakdown of classical physics in arge one dimensional systems", Seminar of Shizuoka University, Hamamatsu- Japan, 15 Ottobre 2014
9. E. Prati, "Atomic scale nanoelectronics: advancements and directions" , Universit´di Parma, Parma 14 Novembre 2014
10. E. Prati, "Single atom based nanoelectronic silicon devices", TUDelft Seminar, 12 Febbraio 2015
11. E. Prati, "Silicon nanoelectronics: from atom base devices to the quantum Moore's law", RIKEN Seminars, Tokyo Japan, 10 Novembre 2015
12. E. Prati, " Silicon nanoelectronics from atom based devices to te quantum Moore's law + extra content on artificial neuronss ", UCL Seminars, Londra, UK, 18 Febbraio 2016
13. E. Prati, "Quantum neuromorphic hardware for quantum artificial intelligence", IIT, Genova 27 Novembre 2016
14. E. Prati, "Single atom devices for nanoelectronics and nanophotonics", Seminario presso FBK e IFN Trento, 16 Febbraio 2017
15. E. Prati, "Single atom devices for nanoelectronics and nanophotonics", Seminario presso Università di Padova, 27 Aprile 2017
16. E. Prati, "Sicurezza e tecnologie quantistiche" Modena 21 Novebre 2017
17. E. Prati, "Machine learning for quantum technology", Seminari del Dipartimento di Fisica, Milano 23 Gennaio 2019
18. E. Prati, "Quantum computers: hardware, software and applications", Seminario della Scuola Superiore Sant'Anna, Pisa 22 Gennaio 2020
19. E. Prati, "Programming artificial intelligence on quantum computers" , Dipartimento di Fisica - Università degli Studi di Milano, online live webinar, 8 Aprile 2020
20. E. Prati, "Deep learning and quantum machine learning: Applications to materials science", Duke University Seminar online, 23 Aprile 2021

21. E. Prati, “Programming artificial intelligence on quantum computers” invito ricevuto da Università Milano Bicocca per il “Ciclo di seminari interdipartimentali sulle tecnologie quantistiche” 14 Giugno 2021

ORGANIZZATORE

Seminari periodici del gruppo Quantum Team presso Polifab, Milano periodo 2019 e 2020 fino chiusura per COVID19

ATTIVITÀ DI RICERCA SCIENTIFICA

PUBBLICAZIONI SCIENTIFICHE (ORCID 0000-0001-9839-202X)

ARTICOLI SU RIVISTA (PEER REVIEWED) (in rosso 12 highlights)

1. E. Prati, Propagation in gyroelectromagnetic guiding systems, J. Electr. Wav. Appl., 17, 8, 1177-1196 (2003) [IF2019 1.373] DOI: 10.1163/156939303322519810
2. E. Prati, S. Faralli, M. Martinelli, G. Annino, G. Biasiol, L. Sorba, Improved Microwave Hall Effect Measurements Method, Review Scientific Instruments, 74, 1, 154-159 (2003) [IF2019 1.480] DOI: 10.1063/1.1523645
3. E. Prati, Crossover between the cell size and the wavelength of the incident radiation in metamaterials, Microw. Opt. Technol. Lett. 40, 4, 272 (2004) [IF 0.743] DOI: 10.1002/mop.11349
4. E. Prati, G. Annino, M. Martinelli, Complex Variational Axial Matching Method for Single-mode and Overmoded Dielectrid Resonators, Electromagnetism, 24, 8, 565-582 (2004) [IF 0.792] DOI: 10.1080/02726340490513257
5. E. Prati, Microwave propagation in ferromagnetic semiconductors, J. Magnetism and Magnetic Materials, 272-276, 3, 1999-2001 (2004) [IF 1.283]
6. G. Ferrari, L. Fumagalli, M. Sampietro, E. Prati and M. Fanciulli, CMOS fully compatible microwave detector based on MOSFET operating in resistive regime, IEEE Microwave and Wireless Components Letters, 15, 7, 445 (2005) [IF2019 2.236] DOI: 10.1109/LMWC.2005.851550
7. G. Ferrari, L. Fumagalli, M. Sampietro, E. Prati and M. Fanciulli, DC current modulation in field effect transistors operating under microwave irradiation for quantum read out, Journal Applied Physics, 98, 044505 (2005) [IF2019 2.328] DOI: 10.1063/1.2007852
8. E. Prati, M. Fanciulli, F. Capotondi, G. Biasiol, L. Sorba, A. Kovalev, J. D. Caldwell, and C.R. Bowers, Magnetoresistively Detected Electron Spin Resonance in Low Density Two Dimensional Electron Gas in GaAs/AlGaAs Single Quantum Wells, IEEE Transactions on Nanotechnology 4, 100 (2005) [IF2019 2.196]
9. E. Prati, M. Fanciulli, G. Ferrari, M. Sampietro, Effect of the Triplet State on the Random Telegraph Signal in Si n-MOSFETs, Physical Review B 74, 033309 (2006) [IF2019 3.575] DOI: 10.1103/PhysRevB.74.033309
10. E. Prati, Microwave Propagation in Round Guiding Structures Based on Double Negative Metamaterials, Int. Journ. Infr. And Mill. Waves, 27, 1227-1239 (2006) [IF 0.692] DOI: 10.1007/s10762-006-9134-3
11. E. Prati, M. Fanciulli, A. Calderoni, G. Ferrari, M. Sampietro, Microwave irradiation effects on random telegraph signal in a MOSFET, Physics Letters A 370, 491-493 (2007) [IF2019 2.278] DOI: 10.1016/j.physleta.2007.05.086
12. E. Prati, M. Fanciulli, Manipulation of localized charge states in n-MOSFETs with microwave irradiation, Physics Letters A 372, 3102-3104 (2008) [IF2019 2.278] DOI: 10.1016/j.physleta.2008.01.039
13. E. Prati, M. Fanciulli, G. Ferrari, A. Calderoni, M. Sampietro, Effect of microwave irradiation on the emission and capture dynamics in silicon metal oxide semiconductor field effect transistors, Journal of Applied Physics 103, 104502, (2008) [IF2019 2.328] DOI: 10.1063/1.2924407
14. E. Prati, M. Fanciulli, G. Ferrari, M. Sampietro, Giant random telegraph signal generated by single charge trapping in submicron n-metal-oxide-semiconductor field-effect transistors, Journal of Applied Physics 103, 1 (2008) [IF2019 2.328] DOI: 10.1063/1.2939272
15. E. Prati, R. Latempa, M. Fanciulli, Microwave Assisted Transport in a Single Donor Silicon Quantum Dot, Physical Review B 80, 14, 165331 (2009) [IF2019 3.575] DOI: 10.1103/PhysRevB.80.165331

16. M. Pierre, R. Wacquez, B. Roche, X. Jehl, M. Sanquer, M. Vinet, E. Prati, M. Belli, M. Fanciulli, Compact silicon double and triple dots realized with only two gates, Applied Physics Letters, 95, 242107 (2009)[IF2019 3.597] DOI: 10.1063/1.3273857
17. E. Prati, R. Latempa, M. Fanciulli, Photon assisted tunneling in quantum dots, in: "Electron spin resonance in low dimensional structures and related phenomena", Topics in Applied Physics, 115/2009, 241-258, Springer (2009) [IF 1.510] DOI: 10.1007/978-3-540-79365-6_12
18. E. Prati, R. Latempa, M. Fanciulli , Microwave Effects in Silicon Low Dimensional Nanostructures, Journal of Nanoscience and Nanotechnology, 10, 4, 2650–2655 (2010) [IF2019 1.354]
19. E. Prati, Finite Quantum Grand Canonical Ensemble and Temperature from Single Electron Statistics in a Mesoscopic Device, Journal of Statistical Mechanics P01003 (2010)[IF2019 2.215] DOI: 10.1088/1742-5468/2010/01/P01003
20. E. Prati, M. Belli, M. Fanciulli and G. Ferrari, Measuring the Temperature of a Mesoscopic Electron System by means of Single Electron Statistics, Applied Physics Letters 96, 113109 (2010) [IF2019 3.597] DOI: 10.1063/1.3365204
21. G. Leti, E. Prati, M. Belli, G. Petretto, M. Fanciulli, R. Wacquez, M. Vinet, and M. Sanquer, Switching quantum transport in a three donors silicon Fin-Field Effect Transistor, Applied Physics Letters, 99, 242102 (2011) [IF2019 3.597] DOI: 10.1063/1.3669702
22. E. Prati, M. Belli, S. Cocco, G. Petretto and M. Fanciulli, Adiabatic Charge Control in a Single Donor Atom Transistor, Applied Physics Letters, 98, 5, 053109 (2011) [IF2019 3.597] DOI: 10.1063/1.3551735
23. F. Costa , C. Amabile, A. Monorchio, E. Prati, Waveguide Dielectric Permittivity Measurement Technique Based on Resonant FSS Filters, IEEE Microwave and Wireless Components Letters, 21,5, 273 - 275 (2011) [IF2019 2.236] DOI: 10.1109/LMWC.2011.2122303
24. E. Prati, Valley Blockade Quantum Switching in Silicon Nanostructures, Journal of Nanoscience and Nanotechnology, 11, 10, 8522-8526 (2011) [IF2019 1.354]
25. C. Amabile, E. Prati, F. Costa, A. Monorchio, Effect of the metal sheet thickness on the frequency blueshift in single layer composite materials at Ka microwave frequency, Progress in Electromagnetic Research Letters 22, 47-58 (2011) DOI: 10.2528/PIERL11010405
26. X. Jehl, B. Roche, M. Sanquer, ..., E. Prati, M. Fanciulli, Mass production of silicon MOS-SETs: Can we live with nano-devices' variability?, Procedia Computer Science 7, pp. 266-268 (2011)
27. E. Prati, M. Hori, F. Guagliardo, G. Ferrari, and T. Shinada, Anderson–Mott transition in arrays of a few dopant atoms in a silicon transistor, Nature Nanotechnology 7, 443–447 (2012) [IF2019 31.538] DOI: 10.1038/nnano.2012.94
28. G. Mazzeo, E. Prati, M. Belli, G. Leti, S. Cocco, M. Fanciulli, F. Guagliardo, and G. Ferrari, Charge dynamics of a single donor coupled to a few-electron quantum dot in silicon, Applied Physics Letters 100, 213107 (2012) [IF2019 3.597] DOI: 10.1063/1.4721433
29. E. Prati, M. De Michielis, M. Belli, S. Cocco, M. Fanciulli, D. Kotekar-Patil, M. Ruoff, D. P Kern, D. A. Wharam, J. Verduijn, G. C. Tettamanzi, S. Rogge, B. Roche, R. Wacquez, X. Jehl, M. Vinet and M. Sanquer, Few electron limit of n-type metal oxide semiconductor single electron transistors, Nanotechnology, 23, 215204 (2012) [IF2019 3.551] DOI: 10.1088/0957-4484/23/21/215204
30. T.-T. Yeh, S. Genovesi, A. Monorchio, E. Prati, F. Costa, T.-Yu H., and T.-J. Yen, Ultra-broad and sharp-transition bandpass terahertz filters by hybridizing multiple resonances mode in monolithic metamaterials, Optics Express, 20, 7, 7580-7589 (2012) [IF2019 3.669] DOI: 10.1364/OE.20.007580
31. M. De Michielis, E. Prati, M. Fanciulli, G. Fiori, G. Iannaccone , Geometrical Effects on Valley-Orbital Filling Patterns in Silicon Quantum Dots for Robust Qubit Implementation, Applied Physics Express 5, 124001 1-3 (2012) [IF2019 3.086] DOI: 10.1143/APEX.5.124001
32. E. Prati, Single electron effects in silicon quantum devices, Journal of Nanoparticle Research 15(5),1615 (2013) DOI: 10.1007/s11051-013-1615-4
33. Y. Shimizu, H. Takamizawa, K. Inoue, F. Yano, Y. Nagai, L. Lamagna, M. Perego, G. Mazzeo, E. Prati, Behavior of phosphorous and contaminants from molecular doping combined with a conventional spike annealing method, Nanoscale, 6(2), 706-710 (2014) [IF2019 6.895] DOI: 10.1039/c3nr03605g
34. E. Ferraro, M. Michielis, G. Mazzeo, M. Fanciulli, and E. Prati, Effective Hamiltonian for the hybrid double quantum dot qubit, Quantum Information Processing, 13, 1 (2014) (ISSN): 1570-0755 [IF2019 2.433] DOI: 10.1007/s11128-013-0718-2
35. Rotta, D., Vellei, A., Mazzeo, G.,..., Prati, E., Fanciulli, M., Spin-dependent recombination and single charge dynamics in silicon nanostructrures, European Physical Journal Plus 129(6),121 (2014) [IF2019 3.229] DOI: 10.1140/epjp/i2014-14121-4
36. E. Ferraro, M. De Michielis, M. Fanciulli, and E. Prati, Effective Hamiltonian for two interacting double-dot exchange-only qubits and their controlled-NOT operations, Quantum Information Processing, 14(1), 47-65 (2015) (ISSN): 1570-0755 [IF2019 2.433] DOI: 10.1007/s11128-014-0864-1

37. M. De Michielis, E. Ferraro, M. Fanciulli, and E. Prati, Universal set of quantum gates for double-dot exchange-only spin qubits with intradot coupling, Journal of Physics A: Mathematical and Theoretical, 48 065304 (2015) [IF2019 1.996] DOI: 10.1088/1751-8113/48/6/065304
38. E. Ferraro, M. De Michielis, M. Fanciulli, and E. Prati, Coherent tunneling by adiabatic passage of an exchange-only spin qubit in a double quantum dot chain, Physical Review B, 91(7), 075435 (2015) [IF2019 3.575] DOI: 10.1103/PhysRevB.91.075435
39. A. Crippa, M.L.V. Tagliaferri, D. Rotta, M. De Michielis, G. Mazzeo, M. Fanciulli, R. Wacquez, M. Vinet, and E. Prati, Valley blockade and multielectron spin-valley Kondo effect in silicon, Physical Review B, 92, 035424 (2015) [IF2019 3.575] DOI: 10.1103/PhysRevB.92.035424
40. E. Prati, K. Kumagai, M. Hori, and T. Shinada, Band transport across a chain of dopant sites in silicon over micron distances and high temperatures, Scientific Reports, 6, 19704 (2016) [IF2019 3.998] DOI: 10.1038/srep19704
41. M. Turchetti, H. Homulle, F. Sebastiano, G. Ferrari, E. Charbon, and E. Prati, Tunable single hole regime of a silicon field effect transistor in standard CMOS technology, Applied Physics Express 9, 014001 (2016) [IF2019 3.086] DOI: 10.7567/APEX.9.014001
42. D. Rotta, M. De Michielis, E. Ferraro, M. Fanciulli, and E. Prati, Maximum density of quantum information in a scalable CMOS implementation of the hybrid qubit architecture, Quantum Information Processing, 15(6), 2253-2274 (2016) (ISSN): 1570-0755 [IF2019 2.433] DOI: 10.1007/s11128-016-1282-3
43. M.L.V. Tagliaferri, A. Crippa, S. Cocco, ...G. Ferrari, and E. Prati,, Modular Printed Circuit Boards for Broadband Characterization of Nanoelectronic Quantum Devices, IEEE Transactions on Instrumentation and Measurement 65(8),7466094, pp. 1827-1835 (2016) (ISSN): 0018-9456 [IF2019 3.658] DOI: 10.1109/TIM.2016.2555178
44. E. Prati, “Atomic scale nanoelectronics for quantum neuromorphic devices, International Journal of Nanotechnology, 13, 7, 509-523 (2016) [IF2019 0.532]
45. E. Prati, E. Giussani, G. Ferrari and T. Asai, “Noise-assisted transmission of spikes in Maeda–Makino artificial neuron arrays", International Journal of Parallel, Emergent and Distributed Systems, 32 (3), pp. 278-286 (2016) DOI: 10.1080/17445760.2016.1189914
46. M.L.V. Tagliaferri A. Crippa, M. De Michielis, G. Mazzeo, M. Fanciulli, and E. Prati, A compact T-shaped nanodevice for charge sensing of a tunable double quantum dot in scalable silico technology, Physics Letters A, 380 (11-12), pp. 1205-1209 (2016) [IF2019 2.278] DOI: 10.1016/j.physleta.2016.01.031
47. D. Rotta, F. Sebastiano, E. Charbon and E. Prati, Quantum information density scaling and qubit operation time constraints of CMOS silicon-based quantum computer architectures, NPJ Quantum Information, 3, 26 (2017) (ISSN): 2056-6387 [IF2019 7.286]
48. H. Homulle, S. Visser, B. Patra, G. Ferrari, E. Prati, F. Sebastiano, and E. Charbon, A reconfigurable cryogenic platform for the classical control of quantum processors, Review of Scientific Instruments 88(4),045103 (2017) (ISSN): 0034-6748 [IF2019 1.480] [39 citazioni Fonte: Scopus] DOI: 10.1063/1.4979611
49. M. Celebrano,. L. Ghirardini, M. Finazzi, Y. Shimizu, Y. Tu, K. Inoue, Y. Nagai, T. Shinada, Y. Chiba, A. Abdelghafar, M. Yano, T. Tanii and E. Prati, 1.54 μm photoluminescence from Er:Ox centers at extremely low concentration in silicon at 300 K, Optics Letters 42, 3311-3314 (2017) (ISSN): 0146-9592 [IF2019 3.714] DOI: 10.1364/OL.42.003311
50. S. Achilli, N. Manini, G. Onida, T. Shinada, T. Tanii, Takashi, and E. Prati, GeV(n) complexes for silicon-based room-temperature single-atom nanoelectronics, Scientific Reports (2018) (ISSN): 2045-2322 [IF2019 3.998] DOI: 10.1038/s41598-018-36441-w
51. R. Porotti, D. Tamascelli, M. Restelli, and E. Prati, Coherent transport of quantum states by deep reinforcement learning, Communications Physics, 2(1), 1-9 (2019) (ISSN): 2399-3650 Nature Publishing Group [IF2019 4.685] DOI: 10.1038/s42005-019-0169-x
52. M. Celebrano, L. Ghirardini, M. Finazzi,...T. Tanii, and E. Prati, Room temperature resonant photocurrent in an erbium low-doped silicon transistor at telecom wavelength, Nanomaterials 9(3),416 (2019) (ISSN): 2079-4991 [IF2019 4.324] DOI: 10.3390/nano9030416
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60. L. Rocutto, E. Prati, A Complete Restricted Boltzmann Machine on an Adiabatic Quantum Computer, International Journal of Quantum Information, accepted, in press (2021) [IF=1.175]
61. M. Maronese, E. Prati, A Continuous Rosenblatt Quantum Perceptron, International Journal of Quantum Information, accepted, in press (2021) [IF=1.175]
62. L. Moro, I. Paparelle, E. Prati, Using Deep Learning for Digitally Controlled STIRAP, International Journal of Quantum Information, accepted, in press (2021) [IF=1.175]
63. M. Maronese, C Destri, E. Prati, Quantum activation functions for quantum neural networks, accepted (2022)
64. S. Corli, L. Moro, D. Galli, E. Prati, Solving Rubik's Cube via Quantum Mechanics and Deep Reinforcement Learning, Journal of Physics A: Mathematical and Theoretical (2021)
65. L. Moro , M. Paris, M. Restelli, E. Prati, Quantum Compiling via Deep Reinforcement Learning, Nature Communication Physics (2021)
66. M. Castriotta, E. Prati, and G. Ferrari, Cryogenic characterization and modeling of a CMOS floating-gate device for quantum control hardware. Solid-State Electronics, 108190 (2021)
67. G. Agliardi and E. Prati, Optimal Tuning of Quantum Generative Adversarial Networks for Multivariate Distribution Loading, Quantum Reports 4(1), 75-105 (2022)

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CURATELE

102. Diósi, L., Elze, H.-T., Fronzoni, L., Prati, E., Vitiello, G., Yearsley, J., 5th International Workshop DICE2010: Space-Time-Matter - Current Issues in Quantum Mechanics and beyond, Journal of Physics: Conference Series 306(1), 011001 (2011)
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107. Elze, H.-T., Blasone, M., Diósi, L., (...), Prati, E., Vitiello, G., DICE 2018 : Spacetime Matter Quantum Mechanics, Journal of Physics: Conference Series 1275(1), 011001 (2019)

LIBRI

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109. Prati, E., Shinada, T., *Single-Atom Nanoelectronics* (Eds.), Pan Stanford Publishing Singapore (2013)
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CAPITOLI DI LIBRO

111. Fanciulli, M, Costa, O, Baldovino, S, Cocco, S, Seguini, G , Prati, E, Scarel, G, Defects at the high-k/semiconductor interfaces investigated by spin dependent spectroscopies, ISBN: 1-4020-4365-1 NATO Series book II-Mathematics Physics and Chemistry on "*Defects in High-K Gate Dielectric tacks*", Vol. 220 p. 263 (2006)
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113. Prati, E., Morello, A., Quantum information in silicon devices based on individual dopants, *Single-Atom Nanoelectronic*, pp. 5-39 Pan Stanford Publishing Singapore (2013) [6 CitazioniWOS]
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116. Crippa, A., Tagliaferri, M., Prati, E., Capacitance Spectroscopy in Single-Charge Device, ISBN: 981477454, 978-9814774543 Eds. Jian V. Li and Giorgio Ferrari *Capacitance Spectroscopy of Semiconductors*, Pan Stanford Series (2018)
117. Prati, E. (2021). Reformulating Physics without Time. In *Rhythmic Oscillations in Proteins to Human Cognition* (pp. 37-50). Springer, Singapore. (2021)
118. M. Maronese, L. Moro, L. Rocutto, E. Prati, Cap. "Quantum Compiling" accepted, in stampa nel libro *Quantum Computer Science* Springer (2021)

FORMALE ATTRIIBUZIONE DI INCARICHI DI RICERCA PRESSO QUALIFICATI ATENEI ESTERI

2010 Visiting Researcher presso Waseda University, Tokyo - Titolo della Ricerca: High Frequency Operability of Single Atom Doped Silicon Quantum Devices

2014 Visiting Scholar [equiparato a Full Professor] presso Waseda University, Tokyo -Titolo della Ricerca: Creation of Single-atom doped silicon photonics dal 06-10-2014 al 27-10-2014
JSPS Fellowship - Titolo della Ricerca: Creation of Single-atom doped silicon photonics

2015 Visiting Scholar [equiparato a Full Professor] presso Waseda University, Tokyo - Titolo della Ricerca: Single-atom devices for photonic applications

2016 Visiting Scholar [equiparato a Full Professor] presso Waseda University, Tokyo - Titolo della Ricerca: Silicon Single Photon Emitters Baased on Er Implantation

PARTECIPAZIONE IN QUALITÀ DI RELATORE A CONGRESSI E CONVEGNI DI INTERESSE INTERNAZIONALE

PLENARY/KEYNOTE SPEAKER

1. E. Prati, IEDM 2014, San Francisco, Dec. 2014 (KEYNOTE) IEDM `la maggiore conferenza al mondo di dispositive elettronicicon 1900 participanti in sala da industria, universita´e centri di ricerca.

TEDx SPEAKER

2. E. Prati, Cosa chiederemo all'oracolo quantistico, TEDxCNR, Rome 8 Oct. 2016

RELATORE INVITATO

3. E. Prati, Microwave effects in silicon nanostructures, ANM 2008, Aveiro, Portugal, 23-25 June 2008
4. E. Prati, From classical to quantum observables in a mesoscopic electronic system, 21st-century directions in de Broglie-Bohm theory and beyond, Vallico, Italy, 28 Aug – 4 Sept. 2010
5. E.Prati, Competition of Spin and Valley Degrees of Freedom in Silicon Quantum Dots for Quantum Information Processing, ANM2010, Agadir, 12-15 Sept. 2010
6. E.Prati Control of the Energy Levels of a Single Atom in a Back Gated Silicon Quantum Dot, Nano2010, Rome, 13-17 Sept. 2010
7. E.Prati, Exploring the foundations of physics in solid state systems at ultra-low energy, DICE2010 - Space Time Matter: QM and Beyond, Castiglioncello, Italy, Sept. 2010
8. E. Prati, Experiments with individual electrons, COST Action: Quantum Mechanics Without Observers, Sesto, Italy, Aug. 2011
9. E. Prati, "From coherent transport to Hubbard band formation in donor array in silicon", Italy-Japan Bilateral Seminar 2011, Tokyo japan 10 Novembre 2011
10. E. Prati, Phase transitions in few electron systems, CORTONA 2012, Convegno Informale di Fisica Teorica, Cortona, May 2012
11. E. Prati, Atom Arrays in Semiconductors: From Quantum Computers to Quantum Encryption, PQCrypto 2011, Rhodes, Greece, Sept. 2012
12. E. Prati, "Deterministic doping – Overview and issues", ITRS 2013, Berkely, 31 Gennaio 2013
13. E. Prati, Formation of Hubbard bands in arrays of a few dopant atoms in a silicon transistor, Edison18, Matsue, Japan, Jul. 2013
14. E. Prati, Atomic scale nanoelectronics for quantum neuromorphic devices, INEC 2014, Hokkaido, Japan, Jul 2014
15. E. Prati, Single ion implantation of Ge donor impurity in silicon transistors, Silicon Nanoelectronic Workshop, Kyoto, Jun 2015
16. E. Prati, Quantum transport in silicon quantum devices: from valley states to the quantum Moore's law, QUAINT 2015, Swansea, UK Jul 2015

17. E. Prati, Quantum information at the time-reversal symmetry edge of quantum chaos, Time Machine Conference 2015, Torino, Italy, Oct. 2015
18. E. Prati, The quantum Moore's law: from atoms to scalability of silicon quantum information processing, PNiP 2015, Cambridge, Dec. 2015
19. E. Prati, CTAP in exchange-only spin qubits and scalability perspectives by CMOS quantum electronics, Mini Symposium "Spatial Adiabatic Passage", Okinawa, , Japan, 25-27 May 2016,
20. E. Prati, “Nanoelectronics for brain emulation at the edge between noise and quantum information processing”, V Symposium Nanoelectronics for brain emulation at the edge between noise and quantum information processing, Sendai, Japan, 27-28 Febriary 2017
21. E. Prati, “Cibernetica del XXI secolo”, L'ecosistema cibernetico al servizio della sicurezza nazionale, Camera dei Deputati 21 Dicembre 2017, Roma
22. E. Prati, “Intelligenza artificiale tra la Potenza e l’atto”, AI+BOTS, Milano, 26 Settembre 2018
23. E. Prati, “Dal deep learning all’intelligenza artificiale quantistica”, Computer Quantistico in Life Science, Forum Sistema Salute, Firenze 12 Otttobre 2018
24. E. Prati, “From Artificial Intelligence to the Quantum Mind”, IOP London and South East Branch Lecture Program Fall 2018, London, UK, 31 Ottobre 2018
25. E. Prati, “Extending he supply chain of silicon towards quantum communications”, Workshop in QKD for Space Systems, Roma, 23 Ottobre 2018
26. E. Prati, “Machine learning for quantum technology”, Quantum Digital Winter Workshop, Milano, Italia, 23 January 2019
27. E. Prati, “Deep Reinforcement Learning for Coherent Transport of Spin Qubits”, Workshop Quantum vs. Classical Technologies: The Electronics Perspective, TUDelft, Delft, The Netherlands, 1 May 2019
28. E. Prati, “Deep reinforcement learning for steering qubits”, Machine Learning for Quantum Technology Workshop 2019, Erlangen, Germany , 8-10 May 2019
29. E. Prati, “Machine Learning in Optical Quantum Technologies”, Workshop ASI/ESA on Optical & Quantum communication, Roma, Italia, 2 July 2019.
30. E. Prati, “Deep learning for quantum technologies”, IQIS2019,Milano, Italia, 9-12 September 2019
31. E. Prati, “Dal deep learning all’intelligenza artificiale quantistica”, SINNOVA 2019, Cagliari, Italia, 4 October 2019
32. E. Prati, “Introduction to quantum computers”, Workshop Quantum computing and High Performance computing, CINECA Casalecchio Reno, Bologna, Italia,, 19 Dec 2019.
33. E. Prati, “Training methods of quantum neural networks”, The 7th International Symposium on Brainware LSI”, Sendai, Japan, 28-29 February 2020 (cancelled for COVID19)
34. E. Prati, “Deep reinforcement learning for quantum firmware”, Codemotion 2020, online, 27 May 2020
35. E. Prati, Seminario del Dipartimento di Fisica – Università Statale di Milano,8 Aprile 2020
36. E. Prati , “Deep learning and quantum machine learning: Applications to materials science”, ACS Spring Meeting, online, 12 Aprile 2021
37. E. Prati, "Multiclass Supervised Learning by Quantum Tensor Networks", IEEE Quantum Week QCE21, Quantum Artificial Intelligence Workshop, online, 20 Ottobre 2021

RELATORE

38. E. Prati, “Electrically detected electron spin resonance in low density GaAs 2DES”, INFM Meeting 2004, Genova 8-10 Giugno 2004
39. E. Prati et al., Atom Arrays in Semiconductors: From Quantum Computers to Quantum Encryption, PQCrypto 2011, Taipei, Taiwan, 2 Dicembre 2011 (RECENT RESULTS SESSION)
40. E. Prati, “Charge dynamics of a single donor coupled to a few electron quantum dot in silicon”, IQIS 2012, Padova 26 Settembre 2012
41. E. Prati, “Timeless physics from an experiental perspective”, Time Machine Conference 2012, Torino 15 Ottobre 2012
42. E. Prati, “Single atom arrays for coherent transport in silicon devices”, International lWorkshop on Silicon Quantum electronics, Villard de Lans, France, 7 Febbraio 2013
43. E. Prati, “Quantum transport at inter-device distance in single-ion implanted arrays of atoms in silicon devices” , Quantum Dots 2014, Pisa, Italy 14 Maggio 2014
44. E. Prati, The quantum Moore's law: an upper bound to the amount of workable quantum information in silicon platform, SiQiP 2015 IoP Conference, Cambridge, Sept. 2015 (SELECTED ORAL)

ORGANIZZAZIONE DI WORKSHOP, CONVEGNI E CONFERENZE INTERNAZIONALI

WORKSHOP INTERAZIONALI

1. L. Diosi, H. T. Elze (Chair), L. Fronzoni, E. Prati, G. Vitiello, DICE2010 “Space, Time, Matter – Current issues in quantum mechanics and beyond.”, Castiglioncello, Sept. 2010. Keynote: L. Montagnier (Nobel Laureate)
2. L. Diosi, H. T. Elze (Chair), L. Fronzoni, J. Halliwell, E. Prati, G. Vitiello, DICE2012 “Space, Time, Matter – Current issues in quantum mechanics and beyond.”, Castiglioncello, Sept. 2012. Keynote: Prof. Y. Aharonov (Wolf Prize)
3. L. Diosi, H. T. Elze (Chair), L. Fronzoni, J. Halliwell, C. Kiefer, E. Prati, G. Vitiello, DICE2014 “Space, Time, Matter – ...news on missing links.”, Castiglioncello, Sept. 2014. Keynote: Prof. G. t’Hooft (Nobel Prize), Prof. A. Connes (Fields Medal)
4. L. Diosi, H. T. Elze (Chair), L. Fronzoni, J. Halliwell, C. Kiefer, E. Prati, G. Vitiello, DICE2016 “Space, Time, Quantum Mechanics”, Castiglioncello, 12-16 Sept. 2016. Keynote: Noam Chomsky
5. L. Diosi, H. T. Elze (Chair), L. Fronzoni, J. Halliwell, C. Kiefer, E. Prati, G. Vitiello, DICE2018 “Space, Time, Quantum Mechanics”, Castiglioncello, 17-21 Sept. 2018. Keynote: G. F. R. Ellis
6.. Cavazzoni, D. Ottaviani, E. Prati “Quantum Computing and High Performance Computing 2019”, Casalecchio Reno (Bologna), Italia with CINECA, 19 December 2019
7. L. Diosi, H. T. Elze (Chair), L. Fratino, J. Halliwell, C. Kiefer, E. Prati, G. Vitiello, DICE2020 “Space, Time, Quantum Mechanics”, Castiglioncello, next Sept. 2020. Keynote: G. T’Hooft (Nobel laureate) (organizzato ma rinviato al 2022 causa COVID19)
8. D. Ottaviani, E. Prati “Quantum Computing and High Performance Computing 2020”, (Online), with CINECA, 15 December 2020
9. M. Caligiuri, E Prati, L. Rucco, “Workshop on Quantum Security” ITASEC21 (online) 7th April 2021
10. “QCE IEEE Quantum Week 2021”, (Online), IEEE October 2021 Steering committee

WORKSHOP BILATERALI ITALIA-GIAPPONE

11. E. Prati and T. Shinada, I Italy–Japan Workshop on Single Atom Control for Future Nanoelectronics, November 2011, Tokyo, Japan (granted by Italian Embassy in Tokyo).
12. E. Prati and T. Shinada, II Italy-Japan Workshop on Silicon nanoelectronics for advanced applications, May 2013, Riva del Garda, Italy (granted by Active Technologies SRL)
13. E. Prati and T. Shinada, III Italy-Japan Workshop on Silicon nanoelectronics for advanced applications, June 2015, Kyoto, Japan (granted by Italian Embassy in Tokyo and CIES Tohoku)
14. E. Prati and T. Tanii, IV ITlay-Japan Workshop Silicon nanoelectronics for advanced applications,, May 2017, Lago di Como, Italy (granted by CNR and JSPS)

ATTIVITÀ GESTIONALI, ORGANIZZATIVE E DI SERVIZIO

INCARICHI DI GESTIONE E AD IMPEGNI ASSUNTI IN ORGANI COLLEGIALI E COMMISSIONI, PRESSO RILEVANTI ENTI PUBBLICI E PRIVATI E ORGANIZZAZIONI SCIENTIFICHE E CULTURALI, OVVERO PRESSO L’ATENEO O ALTRI ATENEI

MEMBRO DI ADVISORY BOARD

1. Organizzazione: CRS4 Consorzio Ricerche Sardegna (2021)
2 Organizzazione: Politecnico di Milano , Osservatorio Quantum Technology (2021)

PANELIST DI ORGANIZZAZIONI

3 ITRS Workgroup on Emerging Research Materials "Deterministic doping" (Berkeley Novembre 2010)
4 ITRS Workgroup on Emerging Research Materials "Deterministic doping" (Berkeley Gennaio 2013)

Data 1 Febbraio 2022 Luogo Milano