

Curriculum



Nome Name:	Maurizio
Cognome Surname:	ARTONI

ORCID:	0000-0002-4291-2740
Scopus Author ID:	7003853096
WOS Author ID:	n.d.
Sito WEB WEB site:	" https://www.unibs.it/it/ugov/person/3447 " and " https://lens.unifi.it/aboutus/profile/maurizio-artoni "

POSIZIONE PROFESSIONALE ATTUALE / CURRENT PROFESSIONAL POSITION:

Posizione attuale Current position:	In servizio
Qualifica Qualification:	Professore Associato confermato
Ateneo/Ente/Azienda University/Institution/Company:	Università degli Studi di BRESCIA
Nazione Ateneo/Ente/Azienda University/Institution/Company Country:	ITA
Anno inizio Start Year:	2002
Anno fine End Year:	n.d.

PRECEDENTI ESPERIENZE LAVORATIVE (ULTIMI 10 ANNI) / PREVIOUS WORK EXPERIENCE (LAST 10 YEARS):

LINGUE / LANGUAGES:

Lingua Language:	Inglese
Scrittura Writing:	C2
Comunicazione Communication:	C2

Lingua Language:	Francese
Scrittura Writing:	C1
Comunicazione Communication:	C1

AREA/SETTORE SCIENTIFICO-DISCIPLINARE / AREA/SECTOR SCIENTIFIC-DISCIPLINARY

Area scientifico-disciplinare Area scientific-disciplinary:	Scienze fisiche
Area scientifico-disciplinare codice Area scientific-disciplinary code:	02
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-Fisica teorica della materia, modelli, metodi matematici e applicazioni
Settore scientifico-disciplinare codice Sector scientific-disciplinary code:	-PHYS-04/A

DESCRIZIONE DEI PRINCIPALI RISULTATI SCIENTIFICI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI MASSIMO 10 PUBBLICAZIONI) / DESCRIPTION OF THE MAIN SCIENTIFIC RESULTS ACHIEVED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 PUBLICATIONS):

Descrizione Description:	<i>Key Achievements and Research Focus. His most significant contributions to date span a range of cutting-edge topics, including quantum control, non-Hermitian physics, topological photonics and quantum coherence in low-dimensional photonic structures. These efforts are all tied together by a central focus: understanding and controlling how light and matter interact, particularly for advancing quantum information, communication technologies (ICT) and wave manipulation in next generation for photonic architectures. With the rapid rise of machine learning and artificial intelligence (AI), he is recently turned his expertise in integrated photonics toward an exciting new goal: developing optical chips that use light instead of electricity. These photonic platforms promise to be faster and more energy-efficient than traditional semiconductor technologies and could become the hardware backbone of the modern AI revolution. SELECTED</i>
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	<p><i>HIGHLIGHTS OF THE MAIN RESULTS follow: 1. QUANTUM LIGHT CONTROL: Demonstration of precise manipulation of single-photon states using chiral light-matter interactions in waveguide quantum electrodynamics (QED) systems with Rydberg atoms. 2. ENHANCED NONLINEAR OPTICS: Proposal to boost nonlinear processes like four-wave mixing to enable the generation of entangled photon pairs (biphotons) using Rydberg interactions. 3. NEW WAVE ENGINEERING METHODS: Extension of the classic Kramers-Kronig relations—typically used for time-based signals—to the spatial domain, allowing the design of materials that support reflection-free wave propagation. 4. NON-HERMITIAN PHYSICS: Demonstration that exceptional points (special types of degeneracies) in atomic lattices may control how light reflects asymmetrically. 5. TIME CRYSTALS: proposal to realise discrete time crystalline order—periodic behavior in time—in Rydberg atom arrays. 6. ASYMMETRIC LIGHT SCATTERING: Demonstration that non-Hermitian structures can cause asymmetrical diffraction patterns (depending on the underlying symmetries). 7. TOPOLOGICAL LIGHT TRANSPORT: Generalization of the famous Su-Schrieffer-Heeger (SSH) model to include phase-dependent couplings, enabling fine control over how light moves along edges in topological systems. 8. PT-ANTISYMMETRY WITHOUT GAIN: Proposal to realise parity-time (PT) antisymmetry in systems without the need for optical gain, challenging the usual requirements for PT-symmetric systems. All these achievements have been made over nearly the past decade and through several major national and international research collaborations, each of which he has led or contributed to with varying levels of responsibility (See Sect. below for details)</i></p>
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PUBBLICAZIONI / PUBLICATIONS:

Anno della pubblicazione Year of publication:	2024
Citazione Citation:	Single-photon manipulations based on optically controlled chiral couplings in waveguide structures of Rydberg giant atoms YT Chen, L Du, Z Wang, M Artoni, GC La Rocca, JH Wu Physical Review A 109 (6), 063710

Anno della pubblicazione Year of publication:	2024
Citazione Citation:	Nonlocal Rydberg enhancement for four-wave-mixing biphoton generation HM Zhao, XJ Zhang, M Artoni, GC La Rocca, JH Wu Physical Review A 109 (4), 043711

Anno della pubblicazione Year of publication:	2024
Citazione	Single-photon manipulations based on optically

Citation:	controlled chiral couplings in waveguide structures of Rydberg giant atoms YT Chen, L Du, Z Wang, M Artoni, GC La Rocca, JH Wu Physical Review A 109 (6), 063710
Anno della pubblicazione Year of publication:	2023
Citazione Citation:	Electromagnetically induced transparency M Artoni Encyclopedia of Condensed Matter Physics, 2nd edition 2, 1-12
Anno della pubblicazione Year of publication:	2015
Citazione Citation:	Spatial Kramers-Kronig relations and the reflection of waves SAR Horsley, M Artoni, GC La Rocca Nature Photonics 9 (7), 436-439
Anno della pubblicazione Year of publication:	2014
Citazione Citation:	Non-Hermitian degeneracies and unidirectional reflectionless atomic lattices JH Wu, M Artoni, GC La Rocca Physical Review letters 113 (12), 123004
Anno della pubblicazione Year of publication:	2015
Citazione Citation:	Parity-time-antisymmetric atomic lattices without gain JH Wu, M Artoni, GC La Rocca Physical Review A 91 (3), 033811
Anno della pubblicazione Year of publication:	2020
Citazione Citation:	Discrete time crystal in a finite chain of Rydberg atoms without disorder C Fan, D Rossini, HX Zhang, JH Wu, M Artoni, GC La Rocca Physical Review A 101 (1), 013417
Anno della pubblicazione Year of publication:	2019
Citazione Citation:	Lopsided diffractions of distinct symmetries in two-dimensional non-Hermitian optical gratings YM Liu, F Gao, JH Wu, M Artoni, GC La Rocca Physical Review A 100 (4), 043801
Anno della pubblicazione Year of publication:	2019
Citazione Citation:	Phase-dependent topological interface state and spatial adiabatic passage in a generalized Su-Schrieffer-Heeger model L Du, JH Wu, M Artoni, GC La Rocca Physical Review A 100 (1), 012112

DESCRIZIONE DEI PRINCIPALI PROGETTI DI RICERCA E PREMI CONSEGUITI NEGLI ULTIMI 10 ANNI (CON ANNESSO ELENCO DI

MASSIMO 10 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PRINCIPAL INVESTIGATOR O COORDINATORE LOCALE DI PROGETTI DI RICERCA COMPETITIVI NAZIONALI O INTERNAZIONALI, SIGNIFICATIVI PREMI CONSEGUITI PER LA PROPRIA ATTIVITÀ DI RICERCA)/ DESCRIPTION OF THE MAIN RESEARCH PROJECTS AND AWARDS AWARDED IN THE LAST 10 YEARS (WITH ATTACHED LIST OF MAXIMUM 10 ACHIEVEMENTS, INCLUDING, FOR EXAMPLE, PRINCIPAL INVESTIGATOR OR LOCAL COORDINATOR OF NATIONAL OR INTERNATIONAL COMPETITIVE RESEARCH PROJECTS, SIGNIFICANT AWARDS AWARDED FOR YOUR RESEARCH ACTIVITY):

<p>Descrizione Description:</p>	<p><i>"Harnessing Color Entanglement For Information and Communication Technology", Research Grant (P.I.) 2018 to 2022 Grant Italian Ministry of Foreign Affairs and International Cooperations (MAECI) & The National Science Foundation of China (NSFC) (Rome & Beijing, IT) URL: https://maurizio-artoni.unibs.it/HCE-ICT/</i></p>
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<p>Descrizione Description:</p>	<p>Over the past decade, he has been a prominent figure in the research landscape of photonics and quantum technologies. At the NATIONAL LEVEL, he has served as Principal Investigator (P.I.) and Project Local Coordinator (P.C.) for three (3) major PRIN-MIUR research projects i.e. "Quantum Communications with Slow Light" (P.C.), "Quantum Coherence and Interference in Nonlinear Optics" (P.C.) and "Toward All-Optical Information Processing in Time-Dependent Photonic Band-Gap Materials" (P.I.), each targeting critical frontiers in quantum science and technology. He also been in charge of the PAISS-INFN advanced research program "Photon-Matter". At the INTERNATIONAL LEVEL he has been equally active and instrumental. He has served in two (2) Italy-China bilateral research programs supported by the Italian Ministry of Foreign Affairs and the National Science Foundation of China. In the latest of these bilateral programs, he led as P.I. the cutting-edge project "Harnessing Color Entanglement for Information and Communication Technology". Beyond deepening the fundamental understanding of the physics behind next-generation quantum and photonic technologies, these two projects have also strengthened international collaboration with leading research centres and universities in China. Additional past leadership roles include heading two (2) joint Italy-Spain initiatives under the "Acciones Integradas" program, respectively as P.I and P.C. as well as a CRUI-British Council Partnership Programs as P.I. Moreover, he has been contributor to two (2.) prominent EUROPEAN UNION NETWORKS: "Nonclassical Light" (P.C.) and "Nanoscale Quantum Optics" (P.C.), the latter being a flagship COST Action supported by the Horizon 2020 Framework. Following his Ph.D. he has received awards from the United States National Academy of Science,</p>
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DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SVILUPPO DI RETI E RELAZIONI SCIENTIFICHE NAZIONALI E INTERNAZIONALI (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, PARTECIPAZIONE O ORGANIZZAZIONE DI CONVEGNI NAZIONALI E INTERNAZIONALI; CONTRIBUTI A CONSORZI DI RICERCA) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS OF DEVELOPMENT OF NATIONAL AND INTERNATIONAL SCIENTIFIC NETWORKS AND RELATIONS (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, PARTICIPATION OR ORGANIZATION OF NATIONAL AND INTERNATIONAL CONFERENCES; CONTRIBUTIONS TO RESEARCH CONSORTIA):

Descrizione Description:	<i>Over the past two decades ha has carried out research in cooperation with both NATIONAL and INTERNATIONAL teams, including G. La Rocca and F. Bassani (SNS, Pisa), P.Tombesi (Camerino University) and with R. Loudon (Essex University, UK), M. Babiker (York University, UK), R. Corbalan and J. Monpart (Universitat Autònoma de Barcelona), S. Horsley (St. Andrews-Exeter University, UK), J. Gao (Jilin University, China) and Jin-Hui Wu (Center for Quantum Sciences, NENU, China).</i>
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Descrizione Description:	He has served as member of the (1) Faculty Advisory Committees of the Italian Ministry of Education, (2) of the Organising Committee and Technical Program Committee of international workshops and of (3) Doctorate Committee (INGEGNERIA DELL'INFORMAZIONE) of the University of Brescia. He has served as a member of Ph.D. Examination Committees over various campuses (> 60 PhD Theses examined).
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DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI DI SUPPORTO ALLA COMUNITÀ SCIENTIFICA (CON ANNESSO ELENCO DI MASSIMO 5 RISULTATI, INCLUDENDO, A TITOLO DI ESEMPIO, RESPONSABILITÀ DI DIREZIONE DI COMITATI EDITORIALI; INCARICHI DI VALUTAZIONE DELLA RICERCA PRESSO ISTITUZIONI NAZIONALI O INTERNAZIONALI; RESPONSABILITÀ ISTITUZIONALI ALL'INTERNO DELL'ISTITUZIONE DI APPARTENENZA O DI ALTRE ISTITUZIONI) / DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10 YEARS IN TERMS

OF SUPPORT TO THE SCIENTIFIC COMMUNITY (WITH ATTACHED LIST OF MAXIMUM 5 RESULTS, INCLUDING, FOR EXAMPLE, MANAGEMENT RESPONSIBILITIES OF EDITORIAL COMMITTEES; RESEARCH EVALUATION ROLES AT NATIONAL OR INTERNATIONAL INSTITUTIONS; INSTITUTIONAL RESPONSIBILITIES WITHIN THE INSTITUTION OF AFFILIATION OR OTHER INSTITUTIONS):

<p>Descrizione Description:</p>	<p><i>Over the past decade he has been the external evaluator in the research assessment for MAJOR NATIONAL AND INTERNATIONAL SCIENCE AND TECHNOLOGY INITIATIVES, including the (1.)"Comissio d'Avaluacio de la Recerca a AQU Catalunya (Spain)", (2.) "John D. and Catherine T. MacArthur Foundation (US)", (3.) "Universite' Pierre et Marie Curie-Sorbonne Universites (Paris)", (4.) "National Science Centre (NCN)" (Poland Ministry of Science and Higher Education), (5.) "National Institute of Science Education and Research (NISER)" (Government of India), (6.) "Italian Ministry of Education, University and Research (MIUR)" and the "National Research Council (CNR)". Very recently he has serve twice (2) as a Panel Member of the European Innovation Council (EIC)/Pathfinder Challenge on "Alternative approaches to Quantum Information Processing, Communication, and Sensing (EU)", and twice (2) Member Expert for the "The Italian Military Centre for Strategic Studies (Ce.Mi.S.S.)" of the National Ministry of Defence.</i></p>
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<p>Descrizione Description:</p>	<p>RESEARCH ASSESSMENT. External evaluator in the research assessment for MAJOR NATIONAL AND INTERNATIONAL SCIENCE AND TECHNOLOGY INITIATIVES, including the (1.)"Comissio d'Avaluacio de la Recerca a AQU Catalunya (Spain)", (2.) "John D. and Catherine T. MacArthur Foundation (US)", (3.) "Universite' Pierre et Marie Curie-Sorbonne Universites (Paris)", (4.) "National Science Centre (NCN)" (Poland Ministry of Science and Higher Education), (5.) "National Institute of Science Education and Research (NISER)" (Government of India), (6.) "Italian Ministry of Education, University and Research (MIUR)" and the "National Research Council (CNR)". Very recently he has served: twice (2) as a Panel Member of the European Innovation Council (EIC)/Pathfinder Challenge on "Alternative approaches to Quantum Information Processing, Communication, and Sensing (EU)", twice (2) Member Expert for the "The Italian Military Centre for Strategic Studies (Ce.Mi.S.S.)" of the National Ministry of Defence.</p>
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DESCRIZIONE DEI PRINCIPALI RISULTATI CONSEGUITI NEGLI ULTIMI 10 ANNI IN TERMINI VALORIZZAZIONE DELLE CONOSCENZE (CON ANNESSO ELENCO DI MASSIMO 3 RISULTATI, RELATIVI ALLA PARTECIPAZIONE DEL CANDIDATO

**ALLE ATTIVITÀ DI VALORIZZAZIONE DELLE CONOSCENZE) /
DESCRIPTION OF THE MAIN RESULTS ACHIEVED IN THE LAST 10
YEARS IN TERMS OF KNOWLEDGE VALORIZATION (WITH
ATTACHED LIST OF MAXIMUM 3 RESULTS, RELATING TO THE
CANDIDATE'S PARTICIPATION IN KNOWLEDGE VALORIZATION
ACTIVITIES):**

Descrizione Description:	
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Descrizione Description:	(1.) "Cina e Italia insieme per la comunicazione quantistica" Platinum/Sole 24 Ore p. 77 July 2021. (2.) "Harnessing Entanglement for Information & Communication Technology (ICT)". Term review for the Ministry of Foreign Affairs and International Cooperation (MAECI) & National Natural Science Foundation of China (NSFC) (Beijing National Convention Center, Nov. 2019).
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Informazioni aggiornate alla data di candidatura 21-05-2025

Maurizio ARTONI

Il presente curriculum costituisce allegato e parte integrante dell'incarico sottoscritto