Decreto Rettore Università di Roma "La Sapienza" n 2246/2021 del 06/08/2021

Curriculum Vitae
ai fini della pubblicazione

(conforme all'art.4 del Codice in materia di protezione dei dati personali e dall'art. 26 del D. Lgs. 14 marzo 2013, n.33)

Part I – General Information

Full Name	
Date of Birth	
Place of Birth	
Citizenship	
Permanent Address	
Mobile Phone Number	
E-mail	
Spoken Languages	Italian (mother tongue), English (fluent spoken and written)

Part II – Education and Work Experience, Leaves

Type	Year	Institution	Notes
University graduation	1999	Sapienza Università di Roma	- Master degree in Physics - Final mark: 110/110 cum laude - Thesis title: "Fast Monitoring system for the Babar drift chamber" - Advisor: Prof. F. Ferroni
Ph.D. in Physics	2003	Sapienza Università di Roma	- Thesis title: "CP violating asymmetries in $B \to D^{(*)}\pi$ decays with the Babar experiment" - Advisor: Prof. F. Ferroni
Post-doc (assegnista di ricerca)	2003-2005	Istituto Nazionale di Fisica Nucleare (INFN), sezione di Roma	- Topic: "Measurement of the angle γ at Babar"
Researcher	2005-2009	INFN, sezione di Roma	- Art.23 by national selection 1N/R3/SUB
Staff researcher	2009 on going	INFN, sezione di Roma	- Current position - III level
maternity leave	2004	-	- 5 months
maternity leave	2006	-	- 5 months

Part III – Academic Appointments

Start	End	Position
05/10/2018	05/10/2024	Abilitazione Scientifica Nazionale II fascia, settore 02/A1

Part IV - Other Appointments, Coordination Roles, Roles

2020-ongoing	Local representative of INFN Technological Transfer Commission at INFN-Roma
2020-ongoing	Responsible of the NEPTUNE Work Package 2 (INFN approved experiment)
2020-ongoing	Responsible of the NEPTUNE Rome group (INFN approved experiment, average annual budget: 10kE)
2019-ongoing	Member of the MEG Speaker Bureau
2012-onging	Team Leader at CERN for the MEG Rome group
2012-ongoing	Responsible of the MEG Rome group (international collaboration for the INFN approved experiment MEG, average annual budget: 50kE)
2012-ongoing	"Responsabile Unico del Procedimento" (RUP) at INFN Roma
2016-2019	Member of the permanent committee for the assignment of post-doc grants of INFN-Roma
2016	Member of the committee in the selection DD n. 1/2016 for the assignment of n 1 "Assegno di Ricerca" at the Physics department of Sapienza Università di Roma
2014-2017	Member of INFN Comitato Unico di Garanzia (CUG)
2012	Member of the examination board for the assignment of the “Conversi Prize” (best Ph.D thesis in High Energy Physics instituted by INFN)
2011	MEG shift coordinator
2006-2007	Convener of the sin2β working group in the Babar experiment
2005-2007	Flavor tagging coordinator in the Babar experiment
2006-2008	Member of the panel for the coordination of Physics analysis in Italy for the Babar experiment
2003	Deputy run coordinator for the Babar experiment
2004-2009	Babar representative in the international Heavy Flavor Averaging Group
1999	Fellowship for “laurea thesis” abroad, given by Sapienza Università di Roma
1997	Fellowship for “collaboration” (150 hours) with the Electronic LAB at Sapienza Università di Roma

Part V – Teaching Experience and III Mission

VA - Courses

Year	Institution	Course
2009-ongoing	Sapienza Università di Roma	Laboratory of Nuclear and Subnuclear Physics for physicists (tutor)
2020	Scuola di specializzazione in Fisica Medica Università Cattolica del Sacro Cuore	Lesson on "Artificial intelligence in the analysis of medical images"
2002-2003	Sapienza Università di Roma	General Physics for biologists (assistant)
2001-2002	Sapienza Università di Roma	General Physics for pharmacists (assistant)
2000-2001	Sapienza Università di Roma	General Physics for physicists (assistant)

VB - Theses

Tutor of > 10 master degree theses, 7 first level theses (dissertazioni), 3 PhD theses.

VC – III Mission

Year	Project	Notes
2019-ongoing	Author for Fisicast	- Podcast about Physics https://www.radioscienza.it/fisicast
2019	Rome CUP 2019	- Partecipazione with stand (INFN related activities).
2019	Pomeriggio di approfondimento	- Organizzato da ADU Sapienza - Intervention on "Artificial Intelligence and medicine"
2017-ongoing	Tutor in Lab2go	- Diffusion of the laboratory practice in high schools, http://www.roma1.infn.it/LAB2GO

Part VI - Society Memberships, Awards and Honors

Year	Role
2009	"Ettore Pancini" prize assigned by the Italian Physics Society for the relevant contribution given to the Babar experiment
2009-2013	Member of the Italian Physics Society

Part VII - Participation to International Research Institutes

Year	Institution
2007-on going	Paul Scherrer Institute (Villigen, Switzerland)
2007-on going	CERN (Geneva, Switzerland)
1998-2010	Stanford Linear Accelerator Center (Stanford, CA)

Part VIII - Funding Information as Principal Investigator-PI or Investigator-I

Year	Title	Program	Grant value
2020-on going	MUCCA (PI of the INFN unit)	CHIST-ERA IV – Call 2019	200kE (INFN unit budget)
2020-on going	ATTRACT (I)	AIRC IG 2020	650kE
2020-on going	Neptune Roma1 (PI)	INFN-commissione scientifica nazionale 5	10kE (annual average)
2012-on going	MEG Roma1 (PI)	INFN-commissione scientifica nazionale 1	50kE (annual average)
2017-2020	FILOBLU (I)	POR-FESR Life2020	700kE
2013	Development of a drift chamber with	FIRB	900kE

	cluster timing and counting capabilities for High Precision High energy Physics (I)		
2008	Dual readout calorimetry (I)	PRIN	unknown

Part IX - Technological Transfer

Year Item

2020-ongoing	Scientific responsible of "Research collaboration agreement" with the start-up MedLea srls in the project "Prognosis and optimization of COVID-19 therapy"
2012	Co-inventor of Patent RM2013A000050 (deposited in 2013) “Sonda di rivelazione di radiazione beta per l’identificazione intraoperatoria di residui tumorali”

Part X - Review Activity

Year Role

2020	Reviewer for Nuclear Instruments and Methods in Physics Research Section A
2016-2017	Reviewer for "Research projects in physics, mathematics or engineering sciences related to cancer" (Cancer ITMO and INSERM)

Part XI - Organization of Meetings

Year Position Conference

2021	Member of the local organizing committee	"Shedding Light on X17" in Rome
2019	Session Chair	105th Congresso Nazionale della Società Italiana di Fisica
2010	Member of the local organizing committee	"Incontri della fisica delle alte energie" in Rome, IFAE

Part XII – Research Activities

Keywords	Brief Description
Particle Physics MEG(II) experiment (2007-ongoing) Topic: Search of Physics beyond Standard Model, Lepton Flavor Violation	The MEG(II) experiment searches for the charged lepton flavour violating decay $\mu \rightarrow e\gamma$ at the Paul Scherrer Institute. The MEG collaboration, composed of ~60 physicists from Italian, Swiss, Japanese, US and Russian institutions, set the most stringent limit in the world (4.2×10^{-13} @90% C.L.) with the data set collected in the years 2009-2013. The experiment is currently being upgraded (MEGII) to improve the sensitivity by one order of magnitude (down to ~5×10^{-14}) in a 3 years data taking period starting from 2021. An observation of this decay would be an

	unambiguous sign of Physics beyond the Standard Model, while setting more stringent limits would be useful to constrain New Physics theoretical models. I am the **coordinator of the MEGII Rome group** (since 2012) and **Member of the MEGII Speaker Bureau** (since 2019); The Rome group responsibilities in MEGII are: • Drift Chamber (DC) HV system; • DC gas system; • DC wire tension measurement system used during the construction phase; • DC calibration and monitoring; • Target position monitoring system which is needed to preserve the angular resolution of the experiment. The group participated to the R&D that led to the DC final design and in the wiring/assembling of the detector. In particular, we built one of the prototypes that demonstrated the achievable spatial resolutions. The group is also leading the feasibility studies for the search of the "X(17 MeV)", possibly observed at Atomki, with the MEGII apparatus. My roles in MEG have been: • **Coordinator of the MEG Rome group** (since 2012); • **Coordinator of MEG MC production** (2010-2013); • Co-author of the physics analysis (e^+-γ time calibration, bayesian analysis); • **Responsible** for the Timing Counter (i.e. the scintillating timing detector) calibration, • Timing Counter commissioning; • **Shift coordination** during data taking. I was invited to talk about MEG(II) to various conferences [c17-c22; c24-c28; c30].
Particle Physics Babar experiment (1999-2010) Topic: CP Violation and B Decays	The Babar detector took data in the years 1999-2008 at the high luminosity B-factory PEPII (Stanford Linear Accelerator Center). The Babar experiment studied (and discovered) the CP violation in the B meson system and several B decays (it also studied charm and tau decays). The Babar collaboration is an international collaboration of~600 physicists from several institutions around the word. My roles/activities in the experiment were: • **Coordinator of the sin2β working group**. The angle β is one of the parameters that describe the CP violation in the B meson system. Under my coordination, the systematic error was reduced by a factor 20% and the overall precision on the parameter was lowered to 5% (2006-2007); • **Coordinator of the flavour tagging working group.** The tagging of the B flavour at the moment of the decay is a

	fundamental ingredient for time-dependent CP and mixing analyses (2005-2007); • **Babar representative at the Heavy Flavour Averaging Working Group** (HFAG) for the B decays to open charm (2004-2009); • Member of the panel for the coordination of the Physics analysis in Italy (2006-2008); • **Deputy Run Coordinator** (2003); • **Primary author** of the analyses of the CP violation in the $B \rightarrow D^{(*)}\pi/\rho$ decays, related to the measurement of the $\sin(2\beta+\gamma)$ parameter; • **Primary author** of the analyses of the $B \rightarrow D^{(*)}_s \pi/\rho$ rare decays. The decay $B \rightarrow D_s\pi$ has been observed for the first time; • Realization of the system for the quality control during LST production for the muon detector (2003); • Production of new RPC for the muon detector (2001-2002); • Member of "B decays to open charm" working group. I worked on the selection of the B sample used for flavour tagging (2000-2001); • Co-author of the B mixing frequency measurement using dilepton events (2000-2001); • Development of the drift chamber fast monitoring system, drift chamber commissioning (1999); I gave several invited talks on the Babar experiment activities [c1-c15]. I was awarded with the **Pancini Prize** for my contribution to the Babar experiment from the Italian Physics Society (2009).
Particle Physics DREAM experiment (2007-2013) Topic: R&D on New Calorimeters	The DREAM (Dual REAdout Method) is an international collaboration (CERN, Italy, USA) which studies the possibility of improving significantly the resolution for hadron calorimeters by measuring the electromagnetic fraction event-by-event, through the detection of the Cerenkov light, produced only by the electromagnetic component of an hadronic shower. This technique is one of the option for the calorimeter of future high-energy circular collider experiments. My activities were: • Test beam with prototypes (scintillating crystals) at the H8 line at CERN; • **Primary author** of the paper on the separation of the Cerenkov and the scintillation light in BGO and PWO crystals. (Invited talk at [c16]); • Co-author of the paper that studied the possibility of separating the Cerenkov and the scintillation light in TeO_2 crystals,

	finalized to the discrimination of the backgrounds in double β decays experiments;
Applied Physics to Medicine (2012 - ongoing) - ARPG group - NEPTUNE experiment Topic: hadrontherapy, radioguided surgery, medical image analysis	Since 2012 I also work to possible medical applications of techniques developed and/or used in the field of particle physics (detectors and analysis). I am currently the **coordinator of the NEPTUNE Rome group** (since 2019). NEPTUNE is an INFN approved experiment which studies the possible enhancement of the radiobiological effectiveness in proton therapy of cancer using nuclear reactions with borated and fluorinated tracers. The Rome group has the responsibility of developing clinical compatible imaging of tracers using 19F magnetic resonance**,** which is affected by low signal to noise ratio, through low noise RF coils, advanced signal processing and image analysis (invited talk at [c29]). Since 2012 I work in the Applied Radiation Physics Group, a group of physicists and bio-engineers from different institutions (INFN, Sapienza Università di Roma). I mainly contributed to the design of a dose profiler detector to be used for monitoring of hadron therapy of cancer as: • Co-author of the measurements of particle fluxes escaping from PMMA phantoms hit by a heavy ion beams at therapeutic energies. The knowledge of the fluxes that come out of the patient is necessary for the design of the dose profiler that exploits this radiation; • **Primary author** of the optimization of the dose profiler design and performance study using simulation. The detector is currently under test CNAO (invited talk at [c23]). I also work in the field of the clinical image analysis in collaboration with different clinical centers (Policlinico Umberto I, IFO) to develop, using advanced machine learning algorithms, automated and personalized diagnostic and prognostic tools. These studies include a collaboration with Policlinico Umberto I in the context of a funded AIRC project on the prediction of response to chemo-radiotherapy in locally advanced rectal cancer with a machine learning analysis of magnetic resonance images,that lead to a publication for which I am **primary author**. I am the **scientific responsible** (since 2020) for the "Accordo di ricerca collaborativa" between INFN and the start-up Medlea for the project "prognosis and optimization of COVID-19 therapy" using biomechanical simulations and lung CT analysis. (invited talk at [c32]).

	I am **PI of the INFN unit of the project MUCCA** (Multi-disciplinary Use Cases for Convergent new Approaches to AI explainability) funded within the **call CHIST-ERA 2019** (Explainable Machine Learning Based Artificial Intelligence). The aim of this project is to develop algorithms to provide explaination of AI system in various use cases from high energy Physics and applied Physics. I am **responsibile of the INFN unit in the funded AIRC "ATTRACT"** (ArTifical inTelligence-based RAdiogenomics in Colon Tumors) in collaboration with Sant'Andrea hospital in Rome. The aim of the project is to develop a radiogenomic-signature of colon tumors, using Artificial Intelligence algorithms. I participated to the funded project FILOBLU (2017-2020) for the development of an App which includes a machine-learning based analysis of the communications between patient and physician.

Part XIII - Talks at International Conferences

c32) 2020- CoViD-19: Inflammation and Molecular Imaging (ISS, Roma, Italy). invited talk on **"COVID-19 therapy optimization by AI-driven biomechanical simulations"**.

c31) 2019- Incontro sulle Nuove Tecnologie applicate alla Medicina, Istituto Superiore di Sanità (Roma, Italy) invited talk on **"The (possible) role of INFN in national-wide projects of AI-based applications to medical data"**.

c30) 2019- 105th Congresso Nazionale della Società Italiana di Fisica (L'Aquila, Italy), invited talk on **"Status and prospects of the MEG-II experiment at PSI"**.

c29) 2019- Advanced Physics for Medicine (Roma, Italy) , invited talk on **"Development of 19 Magnetic Resonance Imaging"**.

c28) 2019- XXV International Symposium PASCOS (Manchester, UK) , invited talk on **"Status and prospects of charged lepton flavor violation searches with the MEG-II experiment"**.

c27) 2018- New Trends In High Energy Physics (Budva, Montenegro), **"Status and prospects of charged lepton flavor violation searches with the MEG-II experiment"**.

c26) 2018- 26th International Conference on Supersymmetry and Unification of Fundamental Interactions, (Barcellona, Spain), **"The quest for μ→e and its experimental limiting factors at future high intensity muon beams"**.

c25) 2017- 19th International Workshop on Neutrinos from Accelerators (Uppsala, Sweden), invited talk on **"Status and prospects of charged lepton flavor violation searches with the MEG-II experiment"**.

c24) 2016 - 2nd International Conference on Charged Lepton Flavor Violation (Charlottesville, USA) invited talk on **"Final result of the MEG experiment and prospects for μ->eγ searches"**.

c23) 2015 - 53th International Winter Meeting on Nuclear Physics (Bormio, Italy) invited talk on ``**A novel dual- mode tracking device for online dose monitoring in hadron therapy''**.

c22) 2014 - 4th Workshop on Flavour Symmetries and Consequences in Accelerators and Technology, (Brighton, UK), invited talk on ``**Results and prospects on MEG experiment''**.

c21) 2013 - 3rd Workshop on the Physics of Fundamental Symmetries and Interactions at Low Energies and the Precision Frontier (Villigen, Switzerland), invited talk on ``**Searching for the lepton flavour violating decay $\mu \to e\gamma$ with the MEG experiment: results and perspectives''**.

c20) 2012 - The XIth International Conference on Heavy Quarks and Leptons (Praga, Czech Rep.), invited talk on ``**Searches of lepton flavour violation in muon decays''**.

c19) 2011 - Università di Roma ``La Sapienza'', Particle Physics seminar on ``**Results of the MEG experiment ''**.

c18) 2010 - 8th Flavor Physics and CP violation 2010 (Torino, Italy) invited talk on ``**Lepton Flavor Violation in $\mu \to e\gamma$''**.

c17) 2009 - Incontri di Fisica delle Alte Energie, VIII Edizione (Bari, Italy) invited talk on ``**Status of the MEG experiment''**.

c16) 2008 - XIII International Conference on Calorimetry in High Energy Physics (Pavia, Italy), invited talk on ``**Separation of PbWO4 and BGO signals into Cerenkov and scintillation component''**.

c15) 2008 - Les Rencontres de Physique de la Vallee d'Aoste, LaThuile, invited talk on ``**Measurement of CKM angles at the B-factories''**.

c14) 2005 - Società Italiana di Fisica, Congresso Nazionale 2005 (Catania, Italy), invited talk on ``**CP violation in B decays in charmless final states with the Babar experiment''**.

c13) 2005 - HEP2005 International Europhysics Conference on High Energy Physics EPS (Lisbona, Portugal) invited talk on ``**Measurements of sin(2β+γ) with BaBar''**.

c12) 2005 - 3rd Workshop on Unitarity Triangle (San Diego, USA), invited talk on `` **sin(2β+γ) constraint from CP asymmetries in B^0 to $D^{(*)}\pi/\rho$ decays''**.

c11) 2005 - Secondo incontro sulla Fisica del Beauty (Bari, Italy) , invited talk on ``**Status of the unitary triangle analysis at the B factories''**.

c10) 2003 - 3rd Meeting of the EuroGDR Supersymmetry (Parigi, France), invited talk on ``**B factory status and perspectives''**.

c9) 2003 - Università di Roma La Sapienza, Particle Physics seminar on ``**The CKM angle γ: recent results and future perspectives with the BaBar detector''**.

c8) 2002 - Società Italiana di Fisica, Congresso Nazionale 2002 (Alghero, Italy), talk on **''Measurement of sin(2β+γ) with the decays B^0 to $D^{(*)}\pi$ at Babar''**.

c7) 2002 - XIV Incontro Fisica delle Alte Energie (Parma, Italy), invited talk on ``**Measurement of the CKM angle γ at the B factories''**.

c6) 2002 - 31st International Conference on High Energy Physics (Amsterdam, Netherlands), invited talk on ``**Measurement of B^0 mixing with Babar''**.

c5) 2002 - American Physical Society, Albuquerque (New Mexico, USA) , talk on ``**Measurement of branching ratio of B0 to Dsπ with BaBar''**.

c4) 2002 - American Physical Society, Albuquerque (New Mexico, USA), talk on ``**Feasibility study on measurement of sin(2β+γ) with the decays B^0 to $D^{(*)}\pi$ at Babar''**.

c3) 2002 - American Physical Society, Albuquerque (New Mexico, USA), talk on ``**Measurement of CP/T violation with dilepton events with BaBar''**.

c2) 2002 - Università di Roma ``La Sapienza'', Particle Physics seminar on ``**Misure di violazione di CP a BaBar''**.

c1) 2000 - Società Italiana di Fisica, Congresso Nazionale 2000 (Palermo, Italy) , talk on ``**Branching ratio measurement of B^0 in charmonium final states at BaBar''**.

Part XIV– Summary of Scientific Achievements

XIVA - Overall Production

Product type	Number	Database	Start	End
Papers (internationals)	523	Scopus	2001	2020

Indicator	Database
Total Impact Factor	2728.3
Total Citations	24039
Average Citations per Product	46.0
Hirsch (H) index	81
Average Impact Factor	5.2

XIVB- Last 15 years

Product type	Number	Database	Start	End
Papers (internationals)	356	Scopus	2006	2021

Indicator	Database
Total Impact Factor	1667.6
Total Citations	15215
Average Citations per Product	42.7
Hirsch (H) index	66
Average Impact Factor	4.7

Part XV– Selected Publications

I have selected 12 publications of the last 8 years relative to my activity in particle physics. I have selected

those with the largest impact factor and number of citations and those that demonstrate my personal contribution and involvement in the different experiments.
My complete list of publications can be found on Scopus (for example).

1) The search for μ→eγ with 10^{-14} sensitivity: The Upgrade of the MEG Experiment
Baldini A. M. et al. [MEG collaboration]
Symmetry, 13(9) 1591 (2021).

2) A photogrammetric method for target monitoring inside the MEG II detector
Cavoto G. et al.,
Rev. Sci. Instrum. 92, 043707 (2021).

3) Search for lepton flavour violating muon decay mediated by a new light particle in the MEG experiment
Baldini, A.M. et al., [MEG collaboration]
Eur. Phys. J. C 80, 858 (2020).

4) Gas distribution and monitoring for the drift chamber of the MEG II experiment
Baldini, A. M. et al.,
JINST 13 P06018 (2018).

5) The design of the MEG II experiment
Baldini. A. M. et al., [MEG collaboration]
Eur. Phys. J. C 78 380, (2018).

6) The quest μ→eγ and its experimental limiting factors at future high intensity muon beams
Cavoto G., Papa A., Renga F., Ripiccini E., Voena, C.
Eur. Phys. J. C 78, 37 (2018).

7) Search for the lepton flavour violating decay μ→eγ with the full dataset of the MEG experiment
Baldini A. M. et al. [MEG collaboration]
Eur. Phys. J. C 76, 434 (2016).

8) Muon polarization in the MEG experiment: predictions and measurements
Baldini A. M. et al. [MEG collaboration]
Eur. Phys. J. C 76, 223 (2016).

9) Measurement of the radiative decay of polarized muons in the MEG experiment
Baldini A. M. et al. [MEG collaboration]
Eur. Phys. J. C 76, 108 (2016).

10) The Physics of the B Factories
Bevan, A. J. et al. [BABAR Collaboration]
Eur. Phys. J. C 74, 3026 (2014).

11) New Constraint on the Existence of the μ→eγ Decay
Adam J. et al. [MEG collaboration]
Phys.Rev.Lett 110, 201801 (2013).

12) The MEG detector for μ→eγ decay search
Adam J. et al. [MEG collaboration]
Eur. Phys. J. C 73, 2365 (2013).

Luogo e Data: Roma, 5 ottobre 2021