Sandro De Cecco
Curriculum Vitae

Part I - GENERAL INFORMATION:

Full Name: Sandro De Cecco
Current position: Professore Associato Dipartimento di Fisica, Sapienza Università di Roma
G.S.D.: 02/PHYS-01 - Fisica sperimentale delle interazioni fondamentali e applicazioni, S.S.D.: PHYS-01/A

Part II - APPOINTMENTS and ACADEMIC CAREER:

• 2022 - Abilitazione Scientifica Nazionale per le funzioni di professore universitario di Prima Fascia SC 02/A1.
• 2016 - Professore Associato at Sapienza Università di Roma, Physics Department
• 2014 - 2019 Member of the “Institut Universitaire de France”, award and research grant.
• 2013 - Abilitazione Scientifica Nazionale a professore universitario di Seconda Fascia SC 02/A1.
• 2007 - 2016 “Maitre de Conférence” (associate professor) Uni. Paris Diderot & LPNHE IN2P3/CNRS.
• 2007 - Qualification aux fonctions de Maître de Conférence (abilitazione seconda fascia) France.
• 2005 - 2007 Post-doc at INFN sezione di Roma 1, activity: ”Bs oscillations at CDF experiment”.
• 2004 - 2006 “Guest Scientist” at Fermilab National Accelerator Laboratory, Particle Physics Division, CDF exp.
• 2003 - 2005 Post-doc at INFN sezione di Roma 1, activity: ”Hadronic B decays analysis at CDF experiment”.
• 1999 - 2002, PhD fellowship “Dottorato di Ricerca in Fisica (XV ciclo), University of Rome “La Sapienza”

Part III - EDUCATION AND TRAINING:

• 2003 PhD in Physics, University of Rome “La Sapienza” thesis subject: “Measurement of relative branching fractions for D0 meson Cabibbo suppressed hadronic decays, from the CDF secondary vertex trigger sample at the Tevatron collider”
• 1999, Laurea in Fisica, University of Rome “La Sapienza” thesis subject: “ Studio della risoluzione e del tracciamento con le camere a drift per lo spettrometro a muoni dell’esperimento ATLAS”
• 1999 Civil Service at “Sovrintendenza ai Beni storici e artistici di Roma e del Lazio”, MIBAC
• 1998 CERN Summer Student, EP ATLAS experiment, muon spectrometer.
• 1993 Maturità scientifica, Liceo Plinio Seniore, Roma

Part IV - TEACHING EXPERIENCE:

• 2025 - titolare del corso “Fisica Nucleare e Subnucleare” (6 CFU) Laurea in Fisica, Sapienza Uni. di Roma.
• 2024 - titolare del corso “Laboratorio di meccanica” (6 CFU) Laurea in Fisica, Sapienza Uni. di Roma.
• 2021 - titolare del corso “Fisica 1” (9 CFU) Laurea Triennale in Scienze Chimiche, Sapienza Uni. di Roma.
• 2019 - 2025 titolare del corso “Nuclear Physics” (6 CFU) Laurea Magistrale in Fisica, Sapienza Uni. di Roma.
• 2016 - 2020 titolare del corso “Laboratorio di meccanica” (12 CFU) Laurea in Fisica, Sapienza Uni. di Roma.
• 2011 - 2016 “Physique Subatomique avancée” Master in Physics, Paris Diderot university.
• 2011 - 2013 “Physique”, Master in “Logique, Philosophie et Histoire des Sciences”, Ecole Normale Supérieure and Paris Diderot university.
• 2011 - 2013 “Electromagnetisme” Licence in Physics, Paris Diderot university.
• 2011 - 2013 “Introduction à la Physique Subatomique: noyaux et particules” Licence in Physics, Paris Diderot
• 2009 - 2016 member of Master in Physics degree jury, Paris Diderot university.

• 2009 al 2012 co-head of the ”Ingénierie Physique des Energies” Master in nuclear energy at Paris Diderot and INSTN-CEA (Institut National de Sciences et Techniques Nucléaires - Commissariat à l’Energie Atomique)
• 2007 - 2012 “Physique Subatomique” Master in Physics, Paris Diderot university.
• 2007 - 2010 “Physique Subatomique avancée” Master in Physics, Paris Diderot university.
• 2007 - 2010 “Travaux pratiques en laboratoire de Mécanique" Licence in Physics, Paris Diderot university.
• 2001 - 2002 “Esperimentazioni di fisica generale I”, laurea in Fisica, Rome La Sapienza university.
• 2000 - 2001 “Fisica Generale II”, laurea in Chimica, Rome La Sapienza university.

Part V - SOCIETY MEMBERSHIP, AWARDS, CERTIFICATIONS:

• 2022 Abilitazione Scientifica Nazionale (ASN 2021) alle funzioni di professore di prima fascia, settore scientifico disciplinare 02/A1.
• 2014 - 2019 Nomina su concorso a **Junior Member dell' Institut Universitaire de France**, accademia universitaria nazionale francese, membro junior (<40 anni) dal 2014 al 2019. Concorso su base competitiva nazionale per docenti di tutte le università francesi di tutte le discipline. La nomina dà diritto per 5 anni alla riduzione di 2/3 del carico di insegnamento nella propria università di afferenza, ed a un salario premiale di 6000 euro l'anno.
• 2014 - 2019 “**Prime d’Excellence Scientifique**” Award, French Ministry of research.
• 2013 Abilitazione Scientifica Nazionale (ASN 2012) alle funzioni di professore di seconda fascia, settore scientifico disciplinare 02/A1.
• 2013 “Autorisation à diriger une Thèse” Université Paris Diderot.
• 2010 - 2014 “**Prime d’Excellence Scientifique**” Award, French Ministry of research.
• 2007 Qualification aux fonctions de Maître de Conférences, Conseil National des Universités, Section 29 - Constituants élémentaires.
• 2000 Abilitazione all’insegnamento nelle scuole secondarie superiori, classe di concorso A038 - Fisica.

Part VI - FUNDING and GRANTS INFORMATION:

• 2025 - Finanziamento bando ricerca Sapienza - progetti piccoli
• 2021 - 2023 PI e titolare fondi **progetto di grande rilevanza MAECI** cooperazione Italia-Federazione Russa (Sapienza-Belgorod) sullo sviluppo di tecnologie scalabili per la produzione di Titanio strutturale ultra radio puro per esperimenti a basso fondo ed alta sensitività di fisica astroparticellare. (Grant sospeso a marzo 2022).
• 2017 - 2018 Finanziamento di base attività di ricerca.
• 2014 - 2019 Nomina su concorso a **Junior Member dell' Institut Universitaire de France**, accademia universitaria nazionale francese, membro junior (<40 anni) dal 2014 al 2019. Concorso su base competitiva nazionale per docenti universitari. **Grant di ricerca** di 75000 euro per 5 anni.
• 2014 - 2018 **PI for the project Grant ”Hbb+ttH@LHC**: couplages du boson de Higgs aux quarks top et bottom ” at LPNHE-CNRS. ANR grant (Agence Nationale de la Recherche) with CEA Saclay, CPPM Marseille, LAL Orsay.
• 2010 - 2014 “Prime d’Excellence Scientifique” Award, French Ministry of research.

Part VII - RESEARCH ACTIVITY SUMMARY:

My research activity is in the field of fundamental interactions and experimental high energy physics. After a contribution to the R&D and test beam of **ATLAS** monitored drift tubes (MDT) detectors for the Atlas muon spectrometer (for the Laurea thesis, defended in 1999), I joined the **CDF collaboration at Fermilab** before the start of Tevatron Collider Run II in 2000. My research in CDF was focused on flavor physics and CP violation in charm and beauty hadrons. I gave a strong contribution to the observation of Bs meson flavor oscillations and served as convener of the “Rare B decays and CP violation” CDF physics group.

In 2008 I re-joined the **ATLAS experiment at LHC** with the LPNHE Paris group and contributed significantly to the Higgs boson discovery in the di-photon decay channel, particularly to the evidence of Higgs vector boson fusion production mechanism, to ATLAS photon trigger and reconstruction performances and to ATLAS detector

operations during LHC Run 1. Since 2013, I worked on the search for the Higgs boson decay to b quarks in the production in association with gauge bosons, on the missing energy significance reconstruction, and on the search for dark matter production at LHC in the mono-Higgs signature with Higgs decaying to b quark pairs with missing energy.

At the end of 2014 I joined the **DARKSIDE collaboration** for the dark matter direct search with liquid argon double phase TPC at LNGS. Within the DARKSIDE collaboration I am involved in both the physics analysis of the current DarkSide-50 experiment (low mass dark matter search in particular) and in the design, R&D and construction of the future DarkSide-20k 20-ton fiducial liquid argon detector of which I am currently appointed as **DarkSide-20k Detector Project Leader** (WBS L0).

As a **P.L.** I am in charge of the **overall DarkSide-20k Detector Coordination** of the different **sub detectors and subgroups**: Time projection Chamber design construction and assembly, Inner and outer neutron vetoes, Calibration system, DAQ, Offline, Material radiopurity, detector prototypes tests, underground Argon cryogenic system and the final detector assembly procedure. The detector Final Design Review and further Production Readiness Review is foreseen in the first part of 2025 before the actual construction. I am in charge of this process, its coordination and its convergence.

Following my arrival at Sapienza University, confronted with the high level of responsibility in the DarkSide collaboration and with the challenge of the construction of the largest and complex Dark Matter detector in the world that will operate for a decade at LNGS, **I chose to concentrate my scientific activity uniquely in the DarkSide project** with 100% of my research FTE's. I consequently left the ATLAS collaboration in 2019 and did not considered joining other projects for the time being. It was not a mandatory choice but the one that better fits with **my vision of professional commitment**.

The DarkSide experiment is undergoing its proposal submissions finalization, funding agency approvals, R&D and starts its construction phase. In the last years a large fraction of my activity has been, and still is, focused on **DarkSide project management duties** which are needed to make the project happen successfully.

Despite a difficult budget closure, some delays and some significant change control processes, **we are now in the full construction phase** of both the infrastructures needed at LNGS and in remote institutions, the last design changes, and detector parts construction. The DarkSide-20k project schedule currently foresees the **detector fully installed and ready for filling with liquid argon at the end of 2026**. The full underground argon target will be delivered by the URANIA and ARIA subprojects in the first part of 2027 and the experiment will start filling, cool down, commissioning and data taking.

The DARKSIDE **Sapienza & INFN Roma group** of which I am the **PI,** is a recognized **pillar of the collaboration** with important responsibilities in the **detector parts** (SS Vessel, TPC mockup, UAr cryogenics, Installation & Integration), in the **DAQ and online** reconstruction, in the **offline reconstruction** and **computing**, and in the **physics analysis** output production for both DarkSide-50 and DarkSide-20k. The group members have **several leading and management roles in the collaboration**: Detector Project Leader (S.D.C.), Physics Coordination (M. Rescigno INFN Roma), Computing TDR main editor (V. Ippolito INFN Roma), former DAQ WG leader (M. Rescigno INFN Roma), DAQ slice test and installation (M.A. Sabia, PhD), TPC mockup and UAr cryogenics on site installation and test (P. Salomone, PhD), former Editorial Board Chair (V. Ippolito INFN Roma), DarkSide-50 Ionization only papers on Migdal effect and Bayesian approach (S. Piacentini, G. Grilli di Cortona, and A. Messina).

Part VIII - SCIENTIFIC and MANAGEMENT RESPONSIBILITIES:

• 2024 - DarkSide-20k **Detector Installation & Integration** Working group chair. Charge: definition of the infrastructures, tools and step by step final assembly of the detector in the Hall-C DarkSide-20k cryostat, temporarily turned into a Radon abated clean room. The working group is formed by the key engineers and physicists of the collaboration institutions involved in the inner detector (NSF, CFI, INFN) and of the hosting lab LNGS.

• 2023 - DarkSide-20k large dimension leak tight **Stainless Steel Vessel** to contain 100 tons of the precious underground depleted liquid argon DarkSide-20k Dark Matter target. Responsibility: Work Breakdown Structure manager S.D.C. INFN Roma. **Low radioactivity SS procurement and Vessel construction**. Design with the support of **Servizio di Progettazione Meccanica INFN Roma**. RUP office and INFN bid procedure started. To be delivered at LNGS in 2026.
• 2022 - Approvazione dell'organigramma della collaborazione internazionale DarkSide "Project Execution/Management Plan for the Darkside-20k Project" come **Project Leader del DarkSide-20k detector**, **Chair del Technical Board** della collaborazione, e membro del **Project Construction Directorate** (protocollo INFN DARKSIDE-CSN2-PMP-2112) sottomesso all'INFN ed all'NSF il 1 dicembre 2021 e baselined a gennaio 2023.
• 2021 - Responsabilità di "**Technical Coordinator"** assegnata dalla Presidenza dell'INFN nel quadro dell'**accordo di collaborazione tra il CERN e l'INFN** per la **costruzione del criostato e della criogenia di DarkSide-20k** presso i Laboratori Nazionali del Gran Sasso. L'accordo di collaborazione è stato approvato dal consiglio direttivo INFN di dicembre 2021. L'appendice di questo accordo sulla descrizione delle specifiche tecniche del sistema criostato e criogenia si basa sul lavoro svolto dal CERN e dalla collaborazione DarkSide, nonché sulla versione dello stesso documento già da me implementata nel capitolato tecnico della procedura di affidamento diretto con l'ufficio RUP che ha terminato i suoi lavori a settembre 2021.
• 2020 - **DarkSide-20k Detector Project Leader** (WBS L0).
• 2020 - DarkSide-20k collaboration **Executive Board** and Institutional board member.
• 2020 - DarkSide collaboration **Technical Board chair**. Definition of the technical choices for the DarkSide-20k detector, the cryostat and cryogenic infrastructures, the assembly facilities, and the interface with the depleted argon projects Urania and Aria.
• 2020 - **Responsabile locale, PI** del gruppo **DarkSide** dell'**INFN Sezione di Roma** & Università La **Sapienza**. L'esperimento DarkSide è una sigla della Commissione Scientifica Nazionale 2 dell'Istituto Nazionale di Fisica Nucleare. Il gruppo, costituito da 5 permanenti, due dottorandi e numerosi studenti, si occupa del rivelatore TPC, della ricostruzione offline e del DAQ dell'esperimento DarkSide-20k. Il gruppo si occupa inoltre dell'analisi dati di fisica dell'esperimento DarkSide-50 per la ricerca di materia oscura di bassa massa, e dell'esperimento ReD (Recoil Directionality) presso i Laboratori Nazionali del Sud dell'INFN.
• 2020 - 2021 **Membro dell'ufficio del RUP** nominato dall'amministrazione centrale dell'INFN per la fornitura e posa in opera del **Criostato e del sistema di criogenia dell'esperimento DarkSide-20k** nella Hall-C dei Laboratori Nazionali del Gran Sasso. Il RUP è l'Ing. Paolo Mereu dell'INFN di Torino, la base di gara per l'affidamento diretto della fornitura al CERN è di circa 8 milioni di euro. La prima riunione dell'Ufficio RUP è stata a luglio 2020 (vedi allegato) per poi proseguire settimanalmente fino a settembre 2021. Prima dell'estate 2021, l'ufficio aveva prodotto tutta la documentazione relativa alla procedura (capitolato tecnico e disciplinare di gara) con una gran mole di lavoro. All'estate 2021 il CERN e l'INFN hanno deciso di ricorrere ad un accordo di collaborazione per espletare questa fornitura. La procedura di affidamento è stata dunque fermata.
• 2019 - 2020 DarkSide-20k collaboration **deputy Project Leader**. (w/ PL Eugenio Scapparone, INFN Bologna).
• 2019 - 2020 **Main editor** of DarkSide-20k detector **Technical Design Report** and **Project Execution Plan** submitted to LNGS and NSF.
• 2018 - **Membro del "comitato di gestione" del progetto PON FARO2030** (bando PON MIUR Infrastrutture di ricerca 2014-2020) ai Laboratori Nazionali del Gran Sasso dell'INFN. Nomina del Presidente dell'INFN come membro del comitato in quanto responsabile dell'Obiettivo Realizzativo OR3 per il bene crostato e criogenia di DarkSide-20k. Stesura del progetto sottomesso al MIUR a giugno 2018 e membro del comitato di gestione ad inizio del progetto a giugno 2019 fino ad oggi. Il progetto FARO2030 ha un finanziamento di crica 19 milioni di euro, dei quali 14 milioni come infrastrutture a supporto dell'esperimento DarkSide, tra cui 8 milioni circa per il criostato e la criogenia.
• 2017 - 2018 DarkSide-20k **low radioactivity TPC Vessel** and construction of **DarkSide prototype 1 ton cryostat**. Designed and built with the support of **Servizio di Progettazione Meccanica INFN Roma**. Delivered at CERN in 2018. DarkSide Work Breakdown Structure L2 manager.
• 2015 - 2017 **ARIS** (Argon Ionization and Scintillation) **experiment** at Orsay ALTO tandem for the characterization of argon scintillation response to collimated fast neutron beam: experiment proposal submission, neutron detectors and supports, commissioning, data taking and physics data analysis,
• 2014 - now DarkSide Institutional board member.

• 2014 - 2016 **Responsabile locale (PI)** del gruppo **DarkSide** dell'**LPNHE**-CNRS-IN2P3 Paris. Il gruppo, costituito da 2 permanenti ed una dottoranda, si è occupato della simulazione montecarlo, della ricostruzione offline dell'esperimento DarkSide-20k e dell'analisi dati dell'esperimento DarkSide-50. Il gruppo ha inoltre contribuito a costruire, installare, fare la presa dati e relativa analisi dell'esperimento ARIS presso il fascio di neutroni Licorne del tandem ALTO all'Institut de Physique Nucléaire di Orsay.
• 2014 - 2016 Scientific Board member (Comité des Responsables Scientifiques) at LPNHE Paris IN2P3-CNRS.
• 2014 - 2018 **PI for the "Hbb+ttH@LHC:** couplages du boson de Higgs aux quarks top et bottom " project at LPNHE. **ANR grant** (Agence Nationale de la Recherche) with CEA Saclay, CPPM Marseille, LAL Orsay.
• 2013 - 2016 Scientific board member of FRIF (Fédération de Recherche sur les Interactions Fondamentales)
• 2013 member of organizing committee of "Journées Collisionneur Linéaire", french workshop on ILC physics, accelerator and detector R&D, Lyon France.
• 2012 - 2013 Chair of organizing committee of "LHC France 2013, 1st French meeting on high energy physics at the LHC", 2-6 April 2013, Annecy.
• 2011 Deputy-chair of local organizing committee of "HCP 2011 - Hadron Collider Physics Symposium" Paris, France 14-18 novembre 2011. Proceeding editor.
• 2010 - 2013 Chair of "Physique ATLAS France" national committee (IN2P3/CNRS e CEA).
• 2009 - 2011 **PI of CDF** collaboration experiment group at **LPNHE Paris** (IN2P3- CNRS)
• 2009 Scientific Rapporteur for the LPNHE-CNRS Scientific Council for Flavor physics (Babar, LHCb, CDF, SuperB).
• 2005 - 2007 **CDF experiment conveener** of "Rare B Decays and CP Violation" CDF collaboration physics group
• 2004 - 2006 **project leader** of the **CDF** experiment **Time of Flight detector**.

Part IX - SUMMARY of SCIENTIFIC ACHIEVEMENTS, chronological order:

• 1998 - 1999 Detector R&D and test beams of gaseous drift chambers: SPS test beams and calibration algorithm for muon drift tubes of Atlas, non linear Argon-CO2 mixture successfully tested.
• 2000 - 2003 Charm physics and CP violation at CDF : initiating charm physics program with the Silicon Vertex Trigger data in CDF collaboration (2000-03, PhD thesis), CPV in charm sector and charm cross section.
• 2003 - 2007 B physics : rare B decays, Bs flavor mixing, direct CP violation, search for FCNC decays at CDF.
• 2004 Hadronic Bs decays : new mode discovered (Bs to PhiPhi) and many rare decays analysis.
• 2004 - 2006 CP Violation convener for CDF collaboration (2004-06)
• 2006 Bs mixing oscillation frequency precise measurement and observation in 2006
• 2006 - 2007 b-jet tagging advanced techniques for Z+bjets and H to b-bar at CDF : development of novel Neural Network continuous b-tagging at CDF.
• 2008 - 2011 Photon reconstruction and trigger in the Atlas experiment at LHC : LAr ECAL, photon trigger performance data driven methods in Atlas and first prompt photon LHC results.
• 2012 Higgs boson discovery, Higgs search into di-photon decay channel strong contribution to evidence (2011) and discovery (2012)
• 2013 Higgs production modes and couplings : evidence for Vector Boson Fusion Higgs production
• 2014 - 2016 Search for the Higgs boson decaying to b quark pairs in Atlas.
• 2015 - 2018 Search for Dark matter production at LHC in the mono-Higgs signature with H boson decaying to b quark pairs in Atlas.
• 2015 First direct dark matter search limit with low radioactivity argon target with the DarkSide-50 detector at LNGS
• 2015 - 2017 ARIS (Argon Ionization and Scintillation) experiment at Orsay ALTO tandem run and publication.
• 2016 Submission of the Technical Proposal for DarkSide-20K, a zero instrumental background multi-ton liquid argon argon TPC detector for dark matter direct search at LNGS.
• 2016 DarkSide-20k L2 for Copper vessel and construction of DS-proto SS cryostat. (WBS manager: S.D.C.)
• 2018 Published Low-mass Dark Matter Search with the DarkSide-50 Experiment
• 2018 Construction of DarkSide-20k Prototype high radio-purity stainless steel 1 ton cryostat delivered at CERN. (WBS manager: S.D.C.)
• 2020 Commissioning and test of the DarkSide-20k Prototype stainless steel 1 ton cryostat and Underground argon cryogenic system at CERN. (WBS manager: S.D.C.)

• 2020 DarkSide-20k Submission of DarkSide-20k TDR to NSF. (main editor: S.D.C.)
• 2021 DarkSide-20k Submission of DarkSide-20k TDR to INFN. (main editor: S.D.C.)
• 2022 DarkSide-20k TDR and Project Execution Plan baselined by the INFN International review committee.
• 2023 Published improved DarkSide-50 Low-mass DM search limits with Migdal effect and Bayesian fit added.
• 2023 Start of construction of the DarkSide-20k cryostat in LNGS Hall-C. (Tech. Coord.: S.D.C.)
• 2023 Final Design Review for the DarkSide-20k Stainless Steel Vessel passed. (WBS manager: S.D.C.)
• 2024 Production Readiness Review for the DarkSide-20k Stainless Steel Vessel passed. (WBS manager: S.D.C.)
• 2024 End of construction of the DarkSide-20k cryostat in LNGS Hall-C. (Tech. Coord.: S.D.C.)
• 2024 Successful commissioning and test of the DarkSide-20k Underground argon cryogenic system with the prototype SS 1 ton cryostat in LNGS Hall-C. (Detector Project Leader: S.D.C.)
• 2024 Start of construction of the DarkSide-20k Atmospheric argon cryogenic system in LNGS Hall-C.(Tech. Coord.: S.D.C.)
• 2024 Start of construction of the DarkSide-20k acrylic TPC mockup. (Detector Project Leader: S.D.C.)
• 2024 "*DarkSide-20k sensitivity to light dark matter particles*" published in Nature Communications
• 2025 Successful cryogenic test of the DarkSide-20k acrylic TPC mockup at LNGS.

Summary of publications and documentation:

Total publications: 1301 of which 1254 articles published on peer reviewed journals on physics results and detector performances mainly for the **CDF, ATLAS** and **DARKSIDE** collaborations; 25 erratums, 12 conference papers, and 10 letters and reviews.
More than 40 internal notes in the **CDF collaboration** on: charm and beauty physics, Bs mixing, rare B decays, b-jet tagging, Z+jets, time-of-flight.
More than 30 internal notes in the **ATLAS collaboration** on: MDT chambers, photon trigger, e-gamma performances, Higgs boson search in di-photon and b quark pairs, Higgs physics, Dark matter search in mono-Higgs signature and missing transverse energy significance reconstruction.

Several articles and internal notes in **physics articles on dark matter search** with DarkSide-50 experiment and on perspectives for DarkSide-20k, with involvement of many students and postdoc of the Roma group that played a **key role in the DarkSide physics analysis** production. Namely on the low mass dark matter searches in the ionization S2 signal only signature, allowing DarkSide-50 to asses the **world best limit in the DM mass range below few GeV**, with Nuclear recoils and Migdal interpretations, and in the recent estimation of the DarkSide-20k sensitivity to light dark matter particles that will improve this limit by two orders of magnitude in only one year of data taking.

Several main editing roles in **official DarkSide collaboration documentation** for the funding agencies (INFN, NSF, DOE, CFI…) in particular the Technical Design Reports, the Project Management Plan, the Project construction, the quarterly reports to the LNGS Scientific Council and to the DarkSide International review committee appointed by INFN and lead by F. Forti (INFN Pisa) and Stew Smith.

Summary of bibliometric indexes (as of July 2024) based on SCOPUS:

• Total publications : 1301
• Total citations : 97322
• H-index : 142

Part X - STUDENT SUPERVISION:

I always considered the **activity of supervising and involving students** in my research activity as **a primary goal as a group leader and University scholar**. Both in Paris during my participation to ATLAS in the large LPNHE group and in Rome leading the DARKSIDE group with only 5 permanents including me - and hence **investing an important fraction of my time in supervising** - I am having good success in involving **new students every year** for their bachelor and Master thesis that are defended with high grades and excellent work

quality, putting them in position to have a **very high rate of being involved in PhD programs** in Sapienza University and also in other universities participating to the DarkSide collaboration, as listed here below:

• 2022 - 2025 **PhD Thesis supervisor** on DarkSide experiment for M.A. Sabia, Dip. Fisica Sapienza. Thesis work on the DarkSide-20k DAQ system and online-offline event reconstruction algorithms.
• 2022 - 2025 **PhD Thesis supervisor** on DarkSide experiment for P. Salomone, Dip. Fisica Sapienza. Thesis work on the DarkSide-20k Underground Argon target purification and cryogenic system and on the acrylic TPC prototype construction
• 2025 **Tesi di Laurea Magistrale**: "*The DarkSide-20k TPC prototype assembly and cryogenic test*" student: L. Pietropaoli, graduation expected Oct. 25, already selected for PhD at T.U.M. University in Munich.
• 2024 **Tesi di Laurea Magistrale**: "*Study of the DarkSide-20k Inner Veto neutron tagging efficiency*" student: S. Tullio, graduation expected Sep. 24, already selected for PhD at Cagliari University.
• 2024 **Tesi di Laurea Magistrale**: "*Discrimination of the Cherenkov background in DarkSide-20k ROI for Dark Matter search*" student: M. Pronesti, graduation expected Oct. 24, already selected for PhD at Marseille University.
• 2024 **Tesi di Laurea Magistrale**: "*Full Offline reconstruction chain and event data model studies for DarkSide-20k analysis and computing TDR*" student: C. Salerno, graduation expected Oct. 24, already selected for PhD at GSSI.
• 2024 **Tesi di Laurea Magistrale**: "*Neutron energy spectrum in the TAPIRO Fast Nuclear Reactor: measurement and applications*" co-advised with ENEA-Casaccia, student: E. Boccitto, graduation Dec. 24.
• 2024 **Tesi di Laurea Magistrale**: "*Simulation of micro instabilities in a toroidally confined plasmas*" co-advised with Max-Planck Institut, student: M. Salerno, graduation expected Dec. 24.
• 2023 **Tesi di Laurea Magistrale**: "*Performances of the new Time Projection Chambers for the upgrade of the near detector of the T2K neutrino oscillations experiment*" co-advised with LPNHE Paris, student: L. Russo. Graduated Oct. 23, now PhD at LPNHE Paris.
• 2023 **Tesi di Laurea Magistrale**: "*Caratterizzazione del processo di assemblaggio e test elettronici dei silicon sensor pixel module per l'upgrade dell'Inner Tracker di ATLAS*" co-advised with LPNHE Paris, student: B. Tamburini. Graduated Dec. 23.
• 2022 **Tesi di Laurea Magistrale**: "*Study of high radio-purity structural materials for the DarkSide-20k TPC and estimation of background budget in a 200 ton years exposure dark matter search*" studente: M. D'Astolfo. Now PhD at GSSI.
• 2022 **Tesi di Laurea Magistrale**: "*The DarkSide-20k Cryogenics system test at CERN*" studente: P. Salomone. Now PhD in my group at Sapienza.
• 2022 **Tesi di Laurea Magistrale**: "*Single photo-electron detection in DarkSide-20k cryogenic SiPMs and studies for a trigger-less data acquisition system*" studente: M.A. Sabia. Now PhD in my group at Sapienza.
• 2022 **Tesi di Laurea Magistrale**: "*Visible and UV spectroscopy in the fusion plasma of PROTO-SPHERA device*" co-advised at ENEA-Frascati, student: J. Delfini.
• 2020 **Dissertazione Triennale**: "*Disegno del rivelatore Dark-Side 20k per ricerca diretta di materia oscura a fondo strumentale nullo*" studente: P. Salomone.
• 2020 **Dissertazione Triennale**: "*Ricerca diretta di materia oscura di bassa massa con la TPC ad argon liquido dell'esperimento DarkSide-50 a LNGS, risultati recenti e prospettive*" studente: M.A. Sabia.
• 2019 **Tesi di Laurea Magistrale**: "*Development and tests of neutron diagnostics at the Swiss TCV Tokamak*" co-advised with EPFL. student: L. Saccoccio.
• 2018 **Tesi di Laurea Magistrale**: "*Realizzazione di un sistema di acquisizione basato su digitalizzatori veloci per la fotoelettronica di lettura dei SiPM dell'esperimento DarkSide-20k per la ricerca di DM*" student: M. Ipri.
• 2015 - 2018 **PhD Thesis supervisor** for D. Portillo, PhD fellowship from LabEx Institut Lagrange de Paris, Ecole doctorale StepUp Paris 7 and 6, LPNHE Paris. Subject "***Search for Dark Matter in the mono-Higgs signature with Higgs decay to b quark pairs in the Altas experiment at LHC***". Now researcher at CNRS
• 2016 **Master 2 thesis supervisor** for A. Navrer-Agasson, Université Paris Diderot, LPNHE Paris. Subject "*Direct Dark Matter search with the DarkSide experiment, full simulation of the liquid argon time projection chamber*". PhD at LPNHE and now postdoc in UK.
• 2014 **Master 2 thesis supervisor** for I. Kucher, Ecole Polytechnique Palaiseau. Subject "Search for Higgs boson decaying in b quarks pairs, preparation of LHC Run 2 analysis at 13 TeV".

• 2010 - 2013 **PhD Thesis supervisor** for O. Davignon, Ecole doctorale 517 ”Particules, Noyaux et Cosmos” Paris 6, 7, 11 and Ecole Normale Supérieure. Subject ”***Search of the Standard Model Higgs boson produced in the Vector Boson Fusion process and decaying to two photons in the Atlas experiment at LHC***”. Now researcher at CNRS-IN2P3 LLR Ecole Polytechnique in the CMS experiment.
• 2013 Licence L3 stage supervisor for N. Lombard, Magistère de Physique de Paris 7. Subject ”*Multivariate analysis of the Higgs to di-photon inclusive sample with the Atlas experiment*”
• 2010 **Master 2 thesis supervisor** for O. Davignon, Master NPAC (Noyaux Particules Astrophysique et Cosmologie) P6, P7, P11, Ecole Normale. Subject “*Performances of the photon reconstruction with the first LHC data collected by the Atlas detector*”
• 2009 CERN Summer Student Supervisor for N. Meric. Subject “*Study of the gamma-Jet events for Jet energy scale calibration with the Atlas detector*”.
• 2009 **Master 2 thesis supervisor** for S. Akar and O. Davignon, Master en physique fondamentale de l’université Pierre et Marie Curie, Paris 6. Subject “*Leading order generation of Vector Boson Fusion Higgs Boson production with CompHep*”.
• 2008 - 2009 **Master thesis supervisor** for A. Sanchez, HELEN fellowship and Universidad de Los Andes, Mérida Venezuela. Subject “*Reconstruction and calibration of hadronic Jets with novel Jet algorithms and preparation to early QCD measurements with the ATLAS detector at the LHC*”.
• 2006 Fermilab Summer Student supervisor. Subject “*CDF SVT trigger selection optimization after upgrade*”.
• 2005 Fermilab Summer Student supervisor. Subject “*Feasibility study for Opposite Side b Flavour Tagging*”.

Part XI - PRESENTATIONS AT CONFERENCES AND SEMINARS:

As already mentioned before, the DarkSide management roles and the student supervising activity beyond the standard teaching duties, is in the recent years, interfering with the possibility of participating in conferences in terms of my time availability. Moreover, I prioritize that younger researchers involved in a project in its construction phase like DarkSide, are given the best opportunity to be recognized for their dedicated work and I certainly preferred to push for them to have good conference talks opportunities rather than putting me forward.

• 2024 Invited seminar on the DarkSide-20k project, Trieste University and INFN.
• 2024 Invited talk on Low energy Ionization signals in DarkSide at EXCESS 2024 conference, Roma.
• 2023 Invited seminar on the DarkSide-20k project in the Neutrino & Dark Matter course, Laurea Magistrale in Fisica Physics, Sapienza.
• 2023 DarkSide collaboration representative at joint DOE-NSF P5 panel report meeting in Washington DC.
• 2023 Invited talk on the DarkSide project at Innovative Detector Technologies and Methods (IDTM), Lisboa.
• 2019 “Low Mass Wimp Result with DarkSide-50 and Prospects for Future Experiments using LAr 20k” TAUP 2019 conference, Toyama, Japan.
• 2018 seminar “New result on low mass dark matter direct search from DarkSide” INFN Sezione di Roma
• 2016 seminar “The DarkSide project for direct dark matter search with liquid argon” University of Roma “La Sapienza”, Dipartimento di Fisica
• 2015 seminar ”First results on dark matter search with the DarkSide experiment and future plans for depleted LAr multi-tons detectors” invited at Laboratoire Univers et Particules Montpellier, France.
• 2013 Standard Model at LHC conference SM@LHC2013 Freiburg, Germany. Talk: “Higgs to di-photon channel in Atlas and CMS”
• 2013 Rencontres de physique de Moriond ElectroWeak La Thuile, Italy. Talk “Heavy Flavor physics at Tevatron”
• 2011 Lomonosov 15th Conference on Elementary Particle Physics, Moscow State University, Moscow, Russia. Talk: “B physics at Tevatron”
• 2010 seminar ”Photon identification at LHC: first results and prospects for SM Higgs search in two photon final state” Università di Roma ”La Sapienza”, Dipartimento di Fisica
• 2010 seminar ”Tagging b-Jets at collider, a tool for discoveries” invited at LIP and Politecnico, Lisboa Portugal.
• 2010 First ReteQuarkonii Workshop RQW2010 Nantes, France. Talk: ”Quarkonium at Tevatron”
• 2010 XXV QCD Workshop 2010 Montpellier, France. Talk: ”B spectroscopy at the Tevatron”
• 2010 BEACH 2010 Perugia, Italia. Talk: ”Heavy Flavor Properties at CDF”.
• 2009 seminar ”The Large Hadron Collider project” invited at Universidad Central de Caracas and Universidad de Los Andes in Merida Venezuela, HELEN exchange program.

• 2008 - 2009 Organizer of “Joint Experimental and Theoretical Meetings” at LPNHE & LPTHE Paris.
• 2008 IFAE 2008, Incontri di fisica delle Alte Energie Bologna, Italia talk: “Oscillazioni e Violazione di CP del Bs”
• 2007 European Physics Society meeting EPS 07 Manchester, UK, talk: “b-jet production at the Tevatron”
• 2007 CDF collaboration meeting Jussieu, Paris, France, talk: “High PT b-tagging at CDF”
• 2007, Workshop IV Incontro sulla fisica del B Accademia delle Scienze, Bologna, Italy; two talks: “Time dependent CP asymmetries at Tevatron” and “Rare decays at Tevatron”
• 2007 seminar “CDF studies of W, Z + Heavy Flavor Jets” invited at ATLAS Standard Model meeting, CERN
• 2006 seminar “Bs mixing measurement in CDF” invited at ATLAS Trigger & Physics week, CERN,
• 2006 Flavour in the LHC Era, Workshop CERN, Geneve; talk: “Measurement of Bs Oscillations at CDF”;
• 2006 DIF06 - International Workshop on Discoveries in Flavor Physics at e+e- Colliders Frascati, Italy; talk: “Perspectives for Charm Physics at Hadron Machines”
• 2005 BEAUTY 2005, 10th International Conference on B-Physics at Hadron Machines Assisi, Italy; talk: “CDF Hot Topics”
• 2005, IFAE 2005 Incontri di fisica delle Alte Energie Catania talk: “Ricerca di oscillazioni del mesone Bs a CDF”
• 2005 seminars “Search for Bs oscillations at CDF” and “CDF experience with the B flavour tagging algorithms” invited at LHC-B General Meeting, CERN
• 2005 seminar “Ricerca delle oscillazioni di Flavour del mesone Bs con l’esperimento CDF” invited at University of Roma Tre
• 2005 seminar “Ricerca delle oscillazioni di Flavour del mesone Bs con l’esperimento CDF” University of Roma “La Sapienza”, Dipartimento di Fisica
• 2004, V Rencontres de Physique du Vietnam, New views on Particle Physics, Hanoi, Vietnam; talk: “Charm Production Cross Section and Charm Physics at the Tevatron”
• 2004 seminar “Physics of the neutral Bs mesons at CDF, recent results and perspectives” University of Roma “La Sapienza”, Dipartimento di Fisica
• 2003 IFAE 2003, Incontri di fisica delle Alte Energie, Lecce, Italy; talk: “Fisica del Charm a CDF”.
• 2002 HCP02, Hadron Collider Physics, Karlsruhe, Germany; talk: “B masses, lifetimes, prospects for B-oscillations and CP-violation at CDF including new charm results”
• 2002 XXX SLAC Summer Institute of Physics, “The secrets of the B meson”, Stanford, CA, USA; “Charm Physics at CDF” poster session.

Part XII - OTHER PROFESSIONAL ACTIVITIES:

• 2025 - Reviewer for Fundacao Ciencia Tecnologia (FCT) grants, Portugal.
• 2024 - Presidente della commissione d’esame finale del Dottorato in Fisica Università di Cagliari.
• 2024 - Reviewer for Journal of Instrumentation
• 2023 - Reviewer for Physics Letter B.
• 2024 - Membro commissione di concorso per un posto di RTDA al Gran Sasso Science Institute.
• 2024 - membro del tavolo di lavoro sulla pace ed eticità della ricerca della Facoltà di Scienze MFN.
• 2023 - 2024 Corsi di Orientamento PNNR - Sapienza erogati agli studenti delle Scuole Secondarie Superiori, nell’ambito del Piano Nazionale di Ripresa e Resilienza – Next Generation EU, finanziato dall’Unione europea.
• 2023 - 2024 co-coordinatore tavolo di lavoro sulla sostenibilità ambientale e cambiamenti climatici del Dipartimento di Fisica.
• 2023 - Membro di due commissioni di concorso per due posti di RTDA al Gran Sasso Science Institute.
• 2022 - Presidente della commissione d’esame del concorso ordinario per la classe di concorso A027 Matematica e Fisica.
• 2022 - Presidente della commissione d’esame del concorso straordinario di cui all’art. 59 comma 9 bis per la classe di concorso A020 Fisica.
• 2022 - Presidente della commissione d’esame del concorso ordinario per la classe di concorso B003 Laboratorio di Fisica.
• 2022 - Presidente della commissione d’esame del concorso ordinario per la classe di concorso A047 Matematica applicata.
• 2022 - Presidente della commissione d’esame del concorso straordinario di cui all’art. 59 commi 4-8 per la classe di concorso B015 Laboratorio di Elettronica.

Part XIII - OUTREACH:

• 2025 Podcasts su energia e armamenti nucleari per la Croce Rossa Italiana, nuclear experience blog.
• 2024 Seminario su invito di associazioni studentesche su “Proiezioni future energia nucleare”, Sapienza.
• 2023 Seminario su invito di associazioni studentesche su “Energia e Reattori Nucleari” Facoltà di Scienze MFN Sapienza.
• 2023 Oct. 31st Dark Matter Day webinar: “The DarkSide project for Dark Matter search at LNGS”, available on INFN youtube channel.
• 2020 Seminario su “La scoperta del bosone di Higgs” Caffè scientifico, Liceo Virgilio, Roma.
• 2018 Presentazione su acceleratori e fisica delle particelle a Masterclass INFN Atlas, Roma.
• 2017 presentation of the movie “Il senso della bellezza” Ancona, Italy.
• 2016 lecture “La quête de la matière noire, the dark side of the universe”, festival des deux infinis, Association Française d’Astronomie, Cité des Sciences de La Villette, Paris, France.
• 2014 presentation of the movie “Particle Fever” MK2 Grand Palais, Paris, France
• 2014 lecture ”Le LHC et le boson de Higgs” THALES GROUP, Elancourt France.
• 2013 lecture ”La découverte du boson de Higgs” Festival des deux Infinis, Association Française d’Astronomie, Paris France.
• 2013 interview for the swiss newspaper ”Le Temps” de Genève: ”ILC l’accélérateur de particules du Futur” with Lynn Evans.
• 2013 organizer of the exhibition ”Le tunnel LHC interactif ” Espace d’expositions “La Turbine”, Annecy, France.
• 2012 interview on the Higgs Boson discovery at the radio program ”Autour de la question”, RFI Radio France International.
• 2012 lecture ”Boson de Higgs, fin de la traque?” Musée des arts et métiers CNAM Paris, France.
• 2012 member of the jury ”Prix de La Recherche 2012” organized by the french scientific magazine ”La Recherche”
• 2012 article “Ou se cache le boson de Higgs?” for the french scientific magazine ”La Recherche” july 2012.
• 2007 - 2010 organizing committee for ”Fête de la Science” LPNHE, Jussieu Paris.
• 1997 guided tours at the exhibition “Quark 2000 - La fisica fondamentale italiana e le sfide del nuovo millennio”, Palazzo delle esposizioni di Roma, Comune di Roma and INFN.

Roma, 29 giugno 2025

Sandro De Cecco