Curriculum Vitae Antonio Trifirò

Personal Information

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Born on 03/06/1973 **in** Milazzo (ME), Italy
Citizenship: Italian

Educational Qualification

PhD in PHYSICS (Nuclear curriculum) at *Università degli Studi di Messina* (24/02/2000);
Laurea (Master) Cum Laude in Physics at *Università degli Studi di Messina* (28/07/1996).

Present Status

- Associate Professor at *Università degli Studi di Messina* from 1/11/2014 (scientific disciplinary sector Fis/04: Nuclear and Subnuclear Physics).
- Responsible of *Messina Electron Linear Accelerator*.
- Responsible of “Centro Ricerche TECNA Territorio - Laboratorio di ricerche sul radiation processing e gli acceleratori lineari di elettroni” of Villafranca Tirrena (ME).
- Member of Physics PhD Committee (as representative of nuclear area) of *Università degli Studi di Messina*.
- Member of the Collaboration Board and Team Leader of the Messina group of ALICE Experiment at the Large Hadron Collider (CERN).

Fields of Interest

Nuclear and Particle Physics; Applied Physics.

Scientific Responsibilities

- Responsible of *Messina Electron Linear Accelerator* (2013-2022);
- Responsible of “Centro Ricerche TECNA Territorio - Laboratorio di ricerche sul radiation processing e gli acceleratori lineari di elettroni” of Villafranca Tirrena (ME) (2013-present);
- Responsible of "Gruppo Collegato di Messina dell’Istituto Nazionale di Fisica Nucleare" (2015-2017);
-Attribution of "Incarico di Ricerca" by Centro Fermi - Museo Storico della Fisica e Centro Studi e Ricerche "Enrico Fermi", Rome, Italy (2017-2019);
- Responsible for INFN-Catania of project Sicilia (Silicon Carbide detectors for Intense Luminosity Investigations and Applications) (2016-2018)
- Responsible in Messina for NEWCHIM experiment, financed by INFN (2015-2017);
- Scientific Responsible of Research Grant titled "Radiation processing mediante un acceleratore di elettroni di bassa energia" (Dott. Lucrezia Auditore, 2013-2014);
- Responsible in Messina for EXOCHIM experiment, financed by INFN (2008-2014);
- Responsible in Messina for Isospin experiment, financed by INFN (2006-2007);
-Attribution of "Incarico di Ricerca" by INFN (2012-present);

-Scientific coordinator of the research program for young researchers entitled "Miglioramento delle proprietà dei polimeri e dei materiali compositi a matrice polimerica mediante radiation processing" financed by *Università degli studi di Messina* (2004).
- Tutor of 5 PHD thesis and more than 30 master and three-year degree thesis.

Awards
Young Researchers Award of 5000,00 euros granted by "Università degli Studi di Messina" (2008).

Evaluation Activity
- Referee for the Physical Review journals and Reviews of Modern Physics;
- Referee of "Futuro in Ricerca 2013 - MIUR" (2013).

Scientific and Organizing Activity for Conferences and Workshops
- Chairman of the International Workshop DeSyT-2019 (Detection Systems and Techniques in Nuclear, Particle and Applied Physics), September 11-13 2019, Messina, Italy;
- XXXVIII Congress of the Italian Society for the History of Physics and Astronomy, October 3-6 2018, Messina, Italy;
- International Workshop "Nuclear Reactions on Nucleons and Nuclei", October 25-26 2017, Messina (Italy);
- International Symposium "Advances in Dark Matter and Particle Physics", October 24-27 2016, Messina, Italy;
- International Conference "Dark Matter, Hadron Physics and Fusion Physics" September 24-26 2014, Messina, Italy;
- WPCF 2013**,** IX Workshop on Particle Correlations and Femtoscopy**,** November 5-8 2013 Acireale (Catania), Italy;
- International Symposium on Entrance Channel Effect on the Reaction Mechanism in Heavy Ion Collisions, November 6-8 2013, Messina, Italy.

Experience in international laboratories
1998-2000
9x2-weeks period at the Vivitron Laboratory of the CRN in Strasbourg (France) participating to the development and set up of ICARE multidetector;
2004-2006
Successfully attended 4 courses of “United Sates Particle Accelerator School” (USPAS):

- Microwave Linear Accelerators (2004, Williamsburg);
- Advanced Beam Dynamics (2005, San Francisco);
- Computational Methods in Beam Dynamics (2005, San Francisco);
- Microwave Measurement and Beam Instrumentation Lab (2006, Phoenix).

1997-present many periods of short presence in various laboratories for the realization of experimental activities (INFN-LNS, INFN-LLN, ENEA-Centro Ricerche Frascati, GANIL, GSI, CERN)

Working Experiences

2009-present
Professor at "Università degli Studi di Messina" and holder of the courses:
- FISICA NUCLEARE (corso di Laurea in Fisica);
- FISICA NUCLEARE E PARTICELLARE (Corso di Laurea Magistrale in Fisica);
- TEORIA DELLE INTERAZIONI FONDAMENTALI (Dottorato di Ricerca in Fisica);
- APPARATI DI RIVELAZIONE IN FISICA NUCLEARE E SUBNUCLEARE (Dottorato di Ricerca in Fisica);
- METODOLOGIE FISICHE APPLICATE AI BENI CULTURALI: modulo METODOLOGIE NUCLEARI IN FISICA APPLICATA (Dottorato di Ricerca in Fisica);
- TECNICHE SPETTROSCOPICHE: modulo RADIOATTIVITA' E SPETTROSCOPIA GAMMA (Dottorato di Ricerca in Fisica);
- FISICA NUCLEARE E SUBNUCLEARE and RADIOATTIVITA' (Scuola di Specializzazione in Fisica Medica).

2009-2014
Researcher and Aggregate Professor at "Università degli Studi di Messina" (S.S.D. Fis/04).

2008/09
CONTRACT PROFESSOR for the course "Laboratorio III Mod. B (LABORATORIO DI FISICA NUCLEARE)" of Physics degree course, at "Università degli Studi di Messina".

2007/08
CONTRACT PROFESSOR for the course FISICA NUCLEARE E SUBNUCLEARE of Physics degree course, at "Università degli Studi di Messina".

2007-2008
CONTRACT OF PROFESSIONAL COLLABORATION with ARPA-Sicilia for the project "Realization of a network for Environmental radioactivity monitoring".

2003-2007
RESEARCH GRANT at Messina University entitled "Applications of low energy electron accelerators"

2002
CONTRACT OF PROFESSIONAL COLLABORATION with Messina University regarding the project "Development of hardware and software tools for neutrino astronomy".

2001-2002
Post-PhD GRANT of Messina University

2000
Messina University Grant entitled "Study of heavy ion reaction mechanisms".

Research activity
Antonio Trifirò was graduated in physics cum laude from the *Università degli Studi di Messina* in 1996. In the same year he was admitted to the PhD nuclear physic program and was awarded PhD on 24 February 2000.
During the PhD course he participated to the PARECO (PArticle REsidue COrrelation) experiment, studying Heavy ion deep inelastic reactions by correlation measurement between projectile-like-fragments and particles emitted by target-like-residues. In this framework he participated to the set

up and development of ICARE multidetector at *Institut de Recherches Subatomiques de Strasbourg*; afterwards he studied several heavy ion reactions throwing light on several features of sequential equilibrium and pre-equilibrium emission.
During this period, he also participated to the set-up of CHIMERA apparatus (Charged Heavy Ion Mass and Energy Resolving Array) a 4π detector made up of 1192 modules, installed at "Laboratori Nazionali del Sud (LNS)" in Catania for multifragmentation studies.
In the period 1999-2002 he participated to the REVERSE experiment (LNS-Catania), studying a number of heavy ion collisions to extract several information on reaction features, such as isospin dependence in the neck formation, cluster production in central collisions and dynamical fission.
In Catania he also participated to the EXCIT experiment (EXotics at CIclotron-Tandem facility), aimed at producing high energy unstable beams with the K800 Superconducting Cyclotron of LNS. In this context he set up a detection system to measure the yield of ^{18}F produced in the beam source.
On 3.3.2000 he won a Messina University Grant entitled "Study of heavy ion reaction mechanism".
During this period, he also joined the NEMO (NEutrino subMarine Observatory) collaborations, aimed to set up an underwater Cherenkov telescope in the Mediterranean Sea looking for high energy neutrinos. In this framework he cooperated to the development of a simulation software for cosmic ray showers necessary for feasibility study and design of the detector.
From October 2000 to September 2002 he enjoyed a Post-PhD grant of University of Messina.
During this period He was widely involved in design and setting-up of a 5MeV electron LINAC, during a collaboration between Messina University and *Istituto Nazionale di Fisica Nucleare*.
In this period he participated to the design, realization and tuning of the microwave resonance cavities, and was widely involved in the design of the electron gun and the coupling between the gun and the RF structures. He also designed and set up magnetron and gun modulators and participated to the realization of an automatic control system which is able to search for and maintain optimal beam conditions.
Afterwards he had a contract of professional collaboration with Messina University regarding the project "Development of hardware and software tools for neutrino astronomy". In this framework he studied and characterized several phototubes for detection of Cherenkov light produced by the passage of a charged particle resulting from a neutrino interaction in water.
In 2002 he joined the ISOSPIN collaboration which had in charge the commissioning of the new 4π device CHIMERA mounted on December 2002 in its complete configuration at the LNS in Catania. In this framework, up to the present, he participated to several campaign pointed to explore the behaviour of highly excited nuclear matter such as liquid-gas phase transition, role of isospin degree of freedom in the Nuclear Equation of State, neck emission, etc.
He also participated to maintenance and development of CHIMERA apparatus.
Afterwards he enjoyed a research grant of Messina University entitled "Applications of low energy electron accelerators". In this framework he studied several applications of radiation processing shooting for improvement of the performance and production processes of polymeric materials. He worked on cross linking, grafting, curing, filament winding and production of new hydrogels. Moreover, he was widely involved with the production of an intense X-ray beam from the electron linac of Messina University, and cooperated to the set up of a complete system for high energy X-ray radiography and tomography for high density items. He participated to the design of a compact neutron sources for neutron radiography and boron-neutron-capture therapy, and to the set up of

several system of electron beam transport and monitoring. Finally, he cooperated to the design and set up of a compact 300KeV electron gun for radiation processing.
In 2004 he presented an academic research project entitled “Improving characteristics of polymers and polymer composite materials by radiation processing”, which was approved and financed by Messina University.
From 2007 to 2008 he was employed by ARPA-Sicilia for the project "Realization of a network for Environmental radioactivity monitoring"; in this context he was widely involved in gamma ray spectroscopy by HPGe detector.
Subsequently he became researcher/professor at Messina University; during these last years He participated in several experiments and projects regarding nuclear and applied physics.
One of these is Calocube, a project financed by INFN in order to develop and set up a calorimeter for high energy cosmic rays suitable to work on orbiting space stations.
From 2011 to 2022 he has been widely involved in design and setting-up of **FARCOS** (Femtosope ARray for COrrelation and Spectroscopy), a new generation apparatus conceived for high precision measurements of two- and multi-particle correlations. In this framework he participated to the development of several detection systems and techniques for charged and neutral particles; moreover, He participated in several correlation studies to obtain information on exotic structures in light nuclei.
From 2016 to 2019 he has been involved (as coordinator for INFN-Catania) in the SICILIA project, financed by *Istituto Nazionale di Fisica Nucleare* for the development of new generation detectors based on Silicon Carbide; these detectors, thanks to their radiation hardness, will be employed for high luminosity applications.
From 2017 to date he is **CERN user** and member of the **ALICE** collaboration, were is particularly involved in the upgrade of the Inner Tracking System, a new tracker based on monolithic silicon pixel sensors; from 2020 is member of the Collaboration Board and **Team Leader** of the Messina Group.
From 2017 he is also member of the EEE (Extreme Energy Event) collaboration, which set up a big network array for the detection of cosmic rays, based on Multi-gap Resistive Plate Chambers. In this framework he is involved in the development of new MRPCs operated with new eco-friendly gas mixtures.
From 2023 is involved (as proposer and coordinator for INFN-Catania) in the project **FUSION** (FUsion StudIes of prOton boron Neutronless reaction in laser-generated plasma) financed by INFN and ENEA for the development of innovative techniques and technologies to support inertial confinement nuclear fusion.