

## Mauro Federico - CURRICULUM VITÆ

**1980** He graduated in Physics at the University of Messina with a grade of 110/110 and academic honors with discussion of the thesis "Ultrasonic properties at low temperatures of glassy alloys of chalcogens "

The results obtained in carrying out the thesis were communicated by him to the congress of the Association Italian Acoustics (AIA) in 1980 and were then published in the journal J. Non-Cryst.Solids.

**1982** He wins the open-ended researcher competition (B01A) and belongs to the Institute of Physics of the University of Messina of the Faculty of Sciences MMFFNN.

It is currently hinged in the FIS/01 SSD

### Scientific activity

Author of over 70 scientific publications in national and international refereed journals, e communications to Congresses, concerning the study of the structural properties of amorphous systems with acoustic (ultrasonic), dielectric, low temperature, high pressure, optical (Raman, Brillouin).

Dr. Federico participated in the construction and development of a bass system temperatures with evaporated helium recovery line (minimum temperature reached: 1K), of a ultrasound device based on the echo-pulse method (covered frequency range: 5 - 330 Mhz) and a laboratory for obtaining amorphous materials with quenching techniques (rapid cooling of a melt which allows to obtain bulk glasses) and evaporation on cold substrates (thin films). He later helped to build a  $^3\text{He}$ - $^4\text{He}$  dilution cryostat (minimum temperature 20 mK) which together with a relative expansion towards the frequencies hypersonic (1-3 GHz) allowed to highlight and study in greater detail the effects deriving from the tunneling of ions in amorphous systems. Since 2015 he has been dealing with the characterization and transformation of materials subjected to high pressures (up to 20 GPa) and high temperatures (up to 1500 ° C)

From 1980 to today, Dr. Federico has devoted himself to the study of disordered systems, with various experimental techniques (ultrasound, low frequency elastic waves, Raman spectroscopy, spectroscopy EXAFS, microwave spectroscopy) above all to investigate the role that lack of order plays in determining the physical properties of such systems. The main lines in which he carried out his research are essentially the following:

- a) Thermal, acoustic and dielectric anomalies of glass at low temperatures.
- b) The phenomenon of the glass transition.
- c) Glasses and superionic polymers. fast ion structure and dynamics.
- d) Dynamic processes in ionic conduction amorphous materials
- e) Structural transformations in amorphous materials subjected to high pressures

Research on the correlation between structure and dynamics in ion conduction glasses is a topic of projects of national interest PRIN 2002/2004 and PRIN 2004/2006 in collaboration with the Physics Department of the Trento, University, with the CNR - Institute for Photonic Materials and Nanotechnologies, Trento; with the CNR - IPCF of Messina, and with the Department of Chemistry-Physics of the University of Pavia.

### **The didactic activity**

The teaching activity of Dr. Federico has developed over the years starting from the completion of the integrative institutional tasks (exercises and internal cycles of seminars) up to the assignment, for substitution or assignment of entire official courses.

He held, by substitute, the course of "Physics", from the academic year. 1992 to the academic year 2005, at the degree course in Medicine and Surgery at the University of Catanzaro.

From a.a. 1991/92, to date, has held the following curricular courses:

1. Acoustics (cds in Physics)
2. Acoustics (LM in Geophysics)
3. Environmental acoustics (cds in Physics)

4. Laboratory of Physical Technologies (cdis in Physics)
5. General Physics II (cdis in AGRINA)
6. Computer science applied to sound (cdis in Computer science)
7. Computer science applied to sound and multimedia (CDs in Computer Science)
8. Sound Processing (CDs in Computer Science)

### **Institutional activity**

Dr. Federico, from 1986 to date, was the representative of the Researchers in the Councils before of the Institute of Physics, then of the Department of Physics, of the Board of the Physics Department, of Council of the Faculty of Sciences MM.FF.NN.

He was a member of the

- Governing body (1998/2000)
- Governing body (2000/2002)
- Academic Senate (2004/2007)
- Technical support body to the Commission for the drafting of the Statute (2011)
- Academic Senate (2015/2018)
- Academic Senate (2018/2021)
- Governing body (2021/2023)

### **Professional experiences**

Dr. Federico was, and is, a trusted scientific technical consultant of the Civil Judiciary, Criminal and Labor at the Courts of: Messina, Barcellona P.G., Patti, Taormina; the Public Prosecutor's Office Republic of Patti and the D.D.A. (Direzione Distrettuale Antimafia) of Catanzaro.

For appraisals and consultancy mainly concerning the propagation of sounds and noises in relation to reactions of the community, to the recognition of occupational diseases, to the analysis of wiretapping.

- for the assessment of the tolerability limits in residential environments (pursuant to DPCM 1.3.91 and subsequent amendments)
- for the defense against noise emissions in the workplace (pursuant to Legislative Decree 277/90 and law 626/94 and subsequent amendments)
- for environmental impact studies
- for the assessment of the environmental risk from electrosmog
- for voice recognition and analysis of environmental and telephone wiretapping.