

## Curriculum *vitae* of Carla Maria Cattadori

### Executive Summary

<b>Current address:</b>	Carla Maria Cattadori INFN Milano Bicocca Piazza della Scienza 3 20126 Milan
<b>Personal details:</b>	Born in Cremona on 11/24/1959. Resident: Via Monviso 37 – 20154 Milan
<b>Research fields:</b>	<ul style="list-style-type: none"><li>• Low energy Neutrino Physics,</li><li>• Double Beta Decay,</li><li>• Neutrino Oscillations,</li><li>• Physics of solar neutrinos.</li><li>• Liquid Argon Detectors.</li><li>• High energy resolution radiation detectors and low background.</li><li>• Analytical measurements of trace elements by non-destructive techniques (Gamma spectrometry, ICPMS and INAA).</li><li>• Natural Radioactivity and Radiocontaminants</li><li>• Neutron measurements</li></ul>
<b>Studies:</b>	<ul style="list-style-type: none"><li>• 2018-2019: Master on Energetics, Renewable Energies e SmartGrid (Politecnico of Milano)</li><li>• Master Laurea Degree in physics on 2/7/1985 at the Milano Statale University, vote 110/110, with a thesis on Experimental of Searches Double beta decay of <math>^{76}\text{Ge}</math>.</li><li>• Diploma Degree (France) in Biochemistry.</li><li>• High school diploma (1978), vote: 56/60.</li></ul>
<b>Languages:</b>	<ul style="list-style-type: none"><li>• English (very good: reading, writing and speaking)</li><li>• French (good reading and conversation, discreet: writing)</li></ul>
<b>Professional Experience:</b>	<ul style="list-style-type: none"><li>• INFN Researcher: Since 2002</li><li>• INFN researcher: 1990-2002</li><li>• INFN Technologist: at the Laboratori Nazionali del Gran Sasso (LNGS) INFN from 1988-1990</li><li>• INFN Fellowship from 1986 to 1988 in the ICARUS Collaboration</li></ul>
<b>Places of employment:</b>	INFN Milano, INFN Milano Bicocca, INFN Laboratori Nazionali del Gran Sasso, CERN

**Research projects:**

**GERDA: Neutrinoless Double Beta Decay Search of the  $^{76}\text{Ge}$  (2005-ongoing)**

Double Beta Decay Searches of  $^{76}\text{Ge}$  (LNGS) with focus on the  $0\nu\beta\beta$  channel.

The experiment was designed and built in short times (2005-2009). The commissioning and optimization strategies to mitigate the residual fund happened in 2010-2011.

2011-2013: Physics data taking. Achieved the project background index. Together with those of Xe projects, the GERDA results are the most sensitive in  $0\nu\beta\beta$  el . The GERDA results are only marginally compatible with the claim of  $0\nu\beta\beta$  observation of a part of the Heidelberg-Moscow collaboration.  $2\nu\beta\beta$  was instead observed and measured: the measured half-life is the most precise available in the field and significantly improved the established precision.

Stringent limits have been set on  $2\nu\beta\beta$  on excited states

Since 2013 GERDA installation is being upgraded: the commissioning lasted the year 2015, while the Phase II Physics data taking restarted few days ago.

Since its early stages (2004) I participated to the GERDA project. My first goal was to create a core of participants inside INFN and Italian Universities. While remaining a German flagship project, INFN involvement in GERDA is significant in terms of funding (about 1/4) and number of participants,

Personal contributions:

- Deputy Spokeperson since 2005
- Member of the Collaboration Board
- Member of the Editorial Board
- Member of the Speaker's Bureau
- National Coordinator INFN from 2005 to 2012 including
- Local INFN MiB
- Member of the Contact Team vs the firm Canberra to produce Enriched phase II detectors

- Responsible for the construction of the water tank (1° screen) and auxiliary facilities
- Coordinator and head of the Front electronics working group
- Run Team Member
- Constant presence in all R&D phases since experimental quelling

#### **ASPERA (2012-2014)**

- PI of the SILENT project (2nd Call of R & D Projects for Future Experiments on Neutrino Mass Measurements)

#### **Research Project of National Interest (PRIN) funded by Italian Ministry of University and Research (MIUR)**

I participated at two PRIN research projects that have been accepted and funded by MIUR:

- **2013-2016** . Protocol No 006, 2010ZXAZK9 Area: 02, duration: 36 months; Project Title "Development of low radioactivity detectors for the study of neutrino mass and nature by double beta decay searches"
- **September 2008-September 2010** . Protocol # 002, 2007JR4STW Area: 02, duration: 24 months, Project title: "Feasibility study of an experiment for neutrinoless double beta decay using liquid scintillator doped with relevant isotopes"

#### **GALLEX/GNO (Gallium Experiment/Gallium Neutrino Observatory) (1991-2003)**

Experiment at LNGS that for over a decade measured the interaction rate of solar neutrinos with high sensitivity to neutrinos of  $pp$ . The experimental apparatus was exposed twice to a source of artificial neutrinos of  $^{51}\text{Cr}$  of PBq activity. The results of GALLEX/GNO today are still a reference and are used in global fit of the recentest solar neutrino experiments and/or as a constraint to the solar models. They have been for long time used in the global analysis for the determination of neutrino mixing parameters.  $^{51}\text{Cr}$  source results are still a milestone in projects SOX/Borexino.

Personal Contributions: data taking and counting system responsible; participation in all stages of data analysis

#### **EASTOP**

Experiment at LNGS for detection and measurement of characteristic parameters of cosmic ray (CR) induced extended air showers of high

energy.

The experiment has identified an excess of events on the occasion of a gamma ray burst and carried out studies of the composition of the CR in coincidence with MACRO and, although of small scale, it was pioneering the implementation in the same apparatus of dedicated detectors for the various components (EM, Hadronic, Cerenkov, muon) of the extended air showers.

Personal contributions: I was involved in the construction and to a lesser extent in the data analysis (correlation between the age parameter and shape parameter of the EM air shower)

**Recent R&D  
Research  
projects R&D  
Research  
projects  
funded by  
INFN CSNV**

**CLYC (2015-2018)**

Project proposed to and approved by the INFN Committee for the new technology (CSNV), to investigate the application of  $\text{Cs}_2\text{LiYCl}_6$  (Ce) detectors. in nuclear physics, dark matter detection, gamma measurements in reactors. CLYC detectors have high efficiency to both  $\gamma$  and n, and high n/ $\gamma$  discrimination. The part of the project on Dark Matter applications has been submitted in late 2015 to Laboratoire Subteraneo de Canfranc and accepted as an R&D.

Personal Contributions: I am the PI and Coordinator of the R&D Project

**Other R&D  
Research  
projects**

**Metals (2005-2008)**

Development of liquid Scintillator doped with elements (Gd, In, Nd) of interest for neutrino physics

Personal Contribution: Coordination of all the activities finalized to the production of 2 tonnes of Liquid Scintillator doped with Gd, for the LVD setup. Today after almost 8 years they are still in use and never show any degradation..

**LENS (Low Energy Neutrino Spectroscopy) R&D (2001-2007)**

International R&D project (LNGS) aimed at building a prototype of a detector for direct measurement of the solar  $pp$  and  $pep$  and  $^7\text{Be}$  neutrinos through a liquid scintillator Yb/Nd doped target having high granularity.

Coordinator of INFN research unit

Personal contributions: Coordination of Italian and Russian working group. Development of a method to determine the light yield of doped liquid scintillators.

**Other  
research  
projects**

**Mass spectrometry for archeometric and geological applications**  
**R&D on SiPM and HPD Phototransductors**  
**ICARUS**  
**BOLOMETERS**  
**MEASUREMENTS of n and gamma**

**Teaching**

- From 1992 to '95-'96 (4 AA) Associate professor for the course of "Detection techniques for nuclear radiation", integrative lecturer of "Experimental physics", at the Master of Science in Physics at University of Milan
- from 1996 to '97-'98 (3 a.a.) Associate professor for the course of "Radiation Detectors", integrative lecturer of "Radioactivity", at the Master of Environmental Science at the University of Milan Bicocca.

**Author IDs**

**SCOPUS ID:** 8643541300

**INSPIRE ID:** INSPIRE-00022409

**ORCID:** 0000-0001-7885-6253

**INSPIRES**

**Bibliometric Indices**

Quotable publications: **127**

Number of citations (excluding self-citations): **9277 (7950)**

Average number of citations per publication: **73.0 (62.6)**

h-index: 35 (**28**)

**Participation  
in**

I participate in many national and international conferences on neutrino physics. I only mention the last major that present a contribution: I

**conferences:** present the results of Gallex ICHEP Conference in July 1993 in Marseille, a Neutrino Telescope in Venice (February 1994) and finally to GARCIA to Osaka in August 2000 ICHEP. I participate in the Baksan school with an invited presentation in April 2001 in are asked by the collaboration of present a new release of data to the TAUP 2001.

I invited presentation on solar neutrinos at the congresso della Societa ' Italiana di Fisica in Lecce in September 1994 and then to Palermo in October 2000. I invited presentation Neutrino 2004 (Paris) and 2012, 2013 EPS 2008, SIF, Neutrino TAUP 2013, 2014 Invisibles (ASPERA), NOW 2014. Work relating to research projects carried out are regularly presented at conferences TAUP, Neutrino, ICHEP etc.

**Programming languages and OS** C, Java, Fortran, Basic, Root  
Unix, Linux, Windows, MacIntosh