

Marco Caresana CV

### **Personal data**

First name: Marco

Family name: Caresana

Date and place of birth 01/09/1964 Novara (Italy)

Marital status: married

Address: Via Bosetti, 4 27036 Mortara (Italy)

Mobile +39 328 4229926

Email: marco.caresana@polimi.it

### **Education and Professional Career**

- 07/14/1989 graduated in Physics at the University of Pavia.
- From 09/27/1988 to 31/08/1989 Professor at the course of Electrical Measurements at the high school "IPSIA Institute" of Pavia.
- 16/01/1991 starts serving at the Department of Nuclear Engineering - CESNEF the Politecnico di Milano as Technician.
- 10/03/1992 passes the examination for radiation protection officer II level (x and gamma radiation).
- 02/09/1993 passes the examination for radiation protection officer III level (neutron radiation).
- 30/12/2002 Starts serving as Researcher at the Department of Nuclear Engineering at Politecnico di Milano
- 5/10/2015 Starts serving as associate professor at the Department of Nuclear Engineering at Politecnico di Milano

### **Scientific activities**

The scientific activity has always been focused on radiation detection and measurements.

#### **Studies and research in the field of acquisition data (1988 - 1994)**

From 1988 to 1994 part of the research has been conducted in collaboration with the university of Pavia and the INFN (Istituto Nazionale di Fisica Nucleare). It was studied an innovative technique for data analysis based on neural algorithms. The software algorithm was then implemented on an ad hoc hardware based on a DSP microprocessors. The main application of the device was the implementation of third level triggers. Such activity has is described in the papers [RI40], [RI41] and [A2].

#### **Studies and research in the field of metrology of radiation X and gamma (1995 - Today)**

This activity began in 1995 and he received from the Department of Nuclear Engineering the commission to realize a Secondary Standard Metrological Laboratory for dosimetry of X and gamma radiation, in view of accreditation by the ACCREDIA (Formerly SIT). On February 1999, the Laboratory is formally accredited by the Italian accreditation body.

Currently the laboratory has calibration capability in terms of: exposure, air kerma, personal and ambient dose equivalent in the energy range 15 keV - 1250 keV.

The lab activity is organized according the Following Lines:

- calibration and characterization of instruments and dosimeters for external customers;
- development of new procedure for calibration of instrumentation;
- development and characterization of new active dosimeters optimized to respond in terms of operational quantities;

- study of the photon rejection capacity of neutron instrumentation;
- support for research groups both internal and external to the Department of Nuclear Engineering at Politecnico di Milano;
- education of students of the master of science in Nuclear Engineering.

The experience of the calibration lab has permitted to develop skills:

- uncertainty evaluation according to the international standards;
- management of a laboratory according to the ISO/IEC 17025;
- organization of metrology and national and international level
- knowledge of problems and needs of the final users of the metrology system (Radiation protection officers, test laboratories etc.)

In the last 15 years the laboratory has generated an almost constant income of about 120k€/year.

The main deliverables are RI 9, RI 36, RI 38, PN 5, PN 10 PN 12 PN 13 PN 14, PI 13, PI 14.

#### Studies and research in the field of radiation protection (1991 - present)

This field of study, started in 1991 in the frame of the film-badge and TLD dosimetric service operating at the Department of Nuclear Engineering at Politecnico di Milano. It is characterized by a very pragmatic approach to operational problems of radiation protection.

The main topics are:

- development of an original algorithm for film-badge dosimetry;
- problems related to passive dosimetry staff;
- problems related to orphan sources and their detection in scrap metal;
- problems related to the characterization of contaminated materials;
- Dosimetry in mixed radiation field;
- Dosimetry in pulsed radiation fields;
- Collaboration with the Italian fire brigades for radioactive survey with UAV (Unmanned Air Vehicles);

Part of these activity have been developed in the EURADOS WG11. In particular leading a task group “pulsed radiation fields” aiming at evaluating the instrument performance in pulsed fields.

#### Studies and research in the field of estimation of uncertainties associated with the measurement process (1998 - present)

This topic derives directly from experience gained managing the secondary standard calibration lab. More than a real research area It is a way of approaching measuring problems. It follows that many of the works are characterized by a great attention to these aspects. In particular the works RI33, RI35, RI36, RI37 represent an original approaches to the evaluation of uncertainties for measurements carried out by test laboratories.

#### Studies and research in the field of metrology and radon monitoring (1994 - present)

This activity began in 1994 with the development of a system for the treatment of LR115 nuclear track detectors and the development of a controlled atmosphere radon chamber. The radon chamber was employed for the measurement techniques studies of radon concentration with electret and with nuclear tracks detectors (RI35, RI37). An important deliverable of this line of research is a patent [B1] for the analysis of LR115 track detectors. The patented method allows to drastically reduce the analysis time. The exploitation rights were acquired by the Italian company Mi.Am srl. The commercialization of the instrument which implements the patented technique began in 2007.

Over the years the focus has shifted to the nuclear track detectors CR 39 thanks to a collaboration with the Miam srl.

The collaboration has led to the development and commercialization of an instrument for the morphological analysis of nuclear traces called POLITRAK.

Other research activities in the field of radon concentration measurements are documented by the works RI3, RI20, RI22, RI25, RI26, RI35, RI36, RI37.

In particular, the RI3 work represents a first attempt to use an innovative sensor-based electronics read-out known as Timepix and coupled to a silicon detector. An evolution of this study, carried out in collaboration with CERN, has allowed the development of a prototype instrument whose response to the energy potential alpha function as a function of particle size of particulate follows quite closely the conversion factor between energy potential alpha and dose in lung. The goal is to develop a tool that allows a direct measurement of the dose in the lung. This line of research has aroused great interest from the radiation protection group at CERN for a possible extension to the measurement of air-borne activity other than Radon and Radon daughters. CERN has funded a doctorate for a joint research on this topic.

#### Studies and research in the field of the measurement of neutron fields (2005 - present)

It is a line of research begun in 2005 in collaboration with the radiation protection department of CERN, and aimed at the personal and environmental dosimetry and spectrometry of neutron fields.

Over the years we have been developed and characterized a number of innovative techniques for the measurement of neutron fields, all based on the detectors to CR39 nuclear tracks. The experience gained in the field of radon measures played a crucial role to extend its use in the field of neutron measurements.

The different techniques studied can be summarized as follows:

1. dosimetry and spectrometry of moderation techniques (Bonner spheres and Rem Counters) Research is documented by the works: RI10, RI17, RI21, RI27, RI28, RI29, RI31.
2. spectrometry neutron fields with an innovative technique called: radiator-degrader. This line of research is documented by the following works: RI19, RI23
3. Neutron Dosimetry personal and environmental through the measurement of the LET of secondary charged particles.

This line of research has led to the following works: RI10, RI11, RI13, RI15, RI18, RI20

The Politrack, originally developed for the monitoring of radon in the air, it was upgraded by implementing the applications described above.

Currently the technique described in 1. is well established and is the standard for environmental dosimetry used at CNAO (Italian hadron therapy centre). The technique described in 3 is a more recent development, but has aroused the interest of radiation protection group of IRSN who decided to adopt it for an extensive measurement campaign of neutron doses on-board aircraft and for neutron dosimetry around hadron therapy centres.

The research lines in this section have been able to develop thanks to:

- a PHD position funded by the CNAO and the company MIAM srl.
- Financing PRIN 2007 "Development of measurement techniques in pulsed neutron fields generated by medical accelerators and research with the use of detectors in nuclear tracks."
- A PhD position funded under the The ARDENT Marie Curie ITN project.

(<https://ardent.web.cern.ch/ardent/ardent.php>)

#### Studies and research in the field of the measurement of pulsed neutron fields with active instruments (2009 - present)

This line of research started to tackle the need, linked to the commissioning of the synchrotron installed at the CNAO, of a reliable beam loss monitor. The time structure of the neutron field around the synchrotron is characterized by short and intense radiation pulses that make the measure particularly complex. The work RI24 describes the proposed approach and the first prototype developed, hereinafter referred LUPIN. The technique has proved particularly effective and promising.

In recent years, given the increase of accelerators in various technological fields, the problem of neutron pulsed fields has seen a growing interest in the international scientific community. In 2011 it

was established a task group within the Working Group 11 of EURADOS with the aim of studying the problem of neutron pulsed fields. The task group, coordinated by Marco Caresana, has organized an instrumental Intercomparison which was attended by many of the leading European research institutes (CERN, PTB, PSI, HZB, HZM, IRSN, INFN, CNAO, DESY, University of Liverpool, Polish Institute of metrology). The work is described in RI7 and represents a first attempt at a systematic study of the performance of instruments, mainly REM- counters in pulsed neutron fields.

Other measurement campaigns were conducted, aiming at characterizing the LUPIN and improve performance. These activities are described in RI3, RI8, RI9, RI14, RI15, RI17. The characterization was carried out in collaboration with CERN who expressed great interest for LUPIN and activated a PhD on the subject. A second PHD position was funded by the ARDENT project.

The LUPIN capability of measuring in pulsed neutron fields has aroused great among people involved in radiation protection/beam diagnostic around free electron laser (FEL) accelerators. In particular, the Paul Scherrer Institute (PSI) adopted the LUPIN as reference instrument for beam diagnostic and radiation protection for the facility "SuisseFEL". About 30 LUPINs are installed along the accelerator. At present LUPIN has been introduced into the market thanks to the technology transfer agreement with the Italian company Else Nuclear.

The agreement has generated an income around 40 k€ during the first year.

### Technology transfer

Much of the research was conducted in collaboration with companies working in the field of nuclear measurements, it is therefore applied research with direct impact in the industrial world.

The research on nuclear track detectors led to the development of a detector reader named Politrack. It is marketed by the firm MiAm srl in different versions, for measurements of radon gas concentration in air or for neutron dosimetry. A third version also implements the BI1 patent. The Politecnico receives a royalty from MiAM for each Politrak, plus an additional fee for the intellectual property, in case the patent is implemented. At the date of this writing 18 Politracks have been distributed, 3 of which are in version for neutron dosimetry and 6 that include the patent.

The research on pulsed neutron fields has led to the development of the LUPIN that is produced and distributed by ELSENUCLEAR. At the date of this writing, about 80 LUPINs has been distributed.

### Teaching activities

Marco Caresana has experience in teaching both in an academic and non academic environments.

### Non academic teaching activities

- teacher at the post graduation Master: "Nuclear and ionizing radiations technologies" organized by the Institute for Advanced Studies - I.U.S.S. Pavia during the years 2003/04, 2004/05, 2005/06, 2006/07, 2009/2010, 2012/2013 and 2013/14, giving lessons about measurements in radiation protection.
- teacher training courses of radiation dosimetry provided by ARDENT project and held during the annual meeting:
  - Statistical analysis and data handling - Vienna 2012
  - Instrumentation 3 - Passive detectors (track detectors, TLDs ...) - Vienna 2012
- Lecturer in the training courses organized by the Italian radiation protection association (AIRP)
  - 47th Course on Radiation Protection of the Higher School "Carlo Polvani" Charterhouse of Calci (Pisa): 28-29 May 2012 Natural Radioactivity.
  - 46th Course on Radiation Protection of the Higher School "Carlo Polvani" Certosa di Calci (Pisa) 25 May 2011 "Neutron detectors"
  - Roma 11/12/2008 "Practical aspects in the use of radiation protection instrumentation. Metrological confirmation "

- Lecturer in the following training courses organized by the Italian association of medical physics (AIFM) as part of the School of Physics in Medicine "P. Caldirola "
  - Siena, November 2016 “Radiation protection in medical activity”
  - Milan, S. Raffaele Hospital in April 2013 " Calibration of radiation protection instrumentation "
  - Milan, S. Raffaele Hospital in April 2012 "Calibration of radiation protection instrumentation, the possibilities of SIT"
  - Gazzada (VA) in April 2011 "Calibration of radiation protection instrumentation, the possibilities of SIT" centers
  - Villa Olmo - Como April 2009 "Calibration of radiation protection instrumentation, the possibilities of SIT" centres
  - Bari, October 2008 "The calibration of the instrumentation - radiation protection for external irradiation "

Academic teaching and service to the Polytechnic students

The teaching activity was carried out in the frame of the Master of Science in Nuclear Engineering of Politecnico di Milano.

Table 1 shows a summary diagram of the academic courses held by Marco Caresana. In dark gray shows the courses held as teaching owner; in light gray the courses where he provided support to teaching in terms of tutorials / seminars.

*Tabella 1. Courses as teaching owner (dark gray) and tutorials/seminars (light gray). When the title is in English, the course is delivered in English*

Course title	Academic year																						
	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	
Radiation detection and measurements																							
Misure e strumentazioni nucleari																							
Laboratorio di Ingegneria nucleare																							
Applicazioni medicali delle radiazioni																							
Protezione e sicurezza negli impianti nucleari																							
Sorgenti di radiazioni nucleari																							
Radioprotezione																							
Fisica tecnica																							
Misura delle radiazioni e protezione																							
Radiochimica																							
Radioprotezione fisica																							
PHD school STEN Radiation Protection and Instrumentation in Nuclear Systems																							

Master thesis followed by Marco Caresana as tutor

- Corrado Cardano - characterization of nuclear instruments for the citizen science - Master Degree in Nuclear Engineering a.a. 2016-17

- Marco Tisi - Initial measurements and studies for the commissioning of an on-line dose monitoring system installed in the new Free Electron Laser facility SwissFEL - Master Degree in Nuclear Engineering a.a. 2016-17
- Alberto Stabilini - Methodological Improvements in Neutron Dosimetry using PADC Detectors - Master Degree in Nuclear Engineering a.a. 2016-17
- Marco Radice -Radiological characterization and elimination path definition of dismantled biological shielding parts of the DIORIT reactor by gamma spectrometry method - Master Degree in Nuclear Engineering a.a. 2016-17
- Gabriele Zorloni - Possible Application of Silica Aerogel for Radiation Measurement - Master Degree in Nuclear Engineering a.a. 2016-17
- Corinna Martinella - Radiation levels at the large hadron collider (Lhc): discussion of the 2015 and 2016 proton physics operations - Master Degree in Nuclear Engineering a.a. 2015-16
- Stefania Peracchi - cosmic radiation dosimetry: detectors calibration during an on-board experience at commercial flight altitudes and improvement of dose assessment for aircrew members - Master Degree in Nuclear Engineering a.a. 2014-15
- Lorenzo Granato - Study of the detector HEPD installed on-board the satellite CSES for the analysis of seismic precursors coming from space - Master Degree in Nuclear Engineering a.a. 2014-15
- Roberto Fornasiero - Automation of the analysis procedure of the emission spectrum in the ECR sources - Master Degree in Nuclear Engineering a.a. 2014-15
- Giovanni Bizzozero - Development of high-resolution compact detectors using silicon photomultiplier - Master Degree in Nuclear Engineering a.a. 2014-15
- Stefano Romano - Development of a new lung dosimeter for radon progeny - Master Degree in Nuclear Engineering a.a. 2014-15
- Stefano Coria - Implementation coincidence techniques in plastic scintillation detectors: study of a possible optimization of technology for radiometric control. - Master Degree in Nuclear Engineering a.a. 2013-14
- Valeria Colombo - LUPIN: active detector for pulsed neutron fields - Master Degree in Nuclear Engineering a.a. 2012-13
- Chiara Bocchinger - Application of ISO 11929 2010 for environmental radioactivity measurements. - Master Degree in Nuclear Engineering a.a. 2011-12
- Greta Girola - neutron spectrometry with CR-39 detectors - Master Degree in Nuclear Engineering a.a. 2010-11
- Giacomo Manessi - active detector for pulsed neutron fields - Master Degree in Nuclear Engineering a.a. 2010-11
- Louis Tedesco - Detection of gamma radiation in industrial applications - Degree in Energy Engineering a.a. 2009-10
- Livio Giorgi - Analysis aging and fading CR39 and LR115 - Degree in Energy Engineering a.a. 2008-09
- Luca Colombo - Study of the behavior of a detector for radon concentration in air, based on a silicon detector - Degree in Energy Engineering a.a. 2007-08
- Francesco Putignano - Production of TENORM in coal plants - Degree in Energy Engineering a.a. 2003-04

*PhD thesis followed by Marco Caresana as tutor*

- Christopher Cassell – Investigation of novel approaches to radiation protection for high energy neutrons - 2016 – University of Wollongong

- Alvin Shala Naik - Neutron Dosimetry and Spectrometry using CR-39 Track Detectors in Complex Radiation Fields - Doctorate in "Science and Radiation Technology" XXVIII cycle (2016) - Politecnico di Milano
- Michele Ferrarini - Characterization of a rem counter and a ball of Bonner extended sensitivity system based on the use of CR39 detectors for environmental monitoring of accelerators for medical applications - Doctorate in "Science and Radiation Technology" XIX cycle (2007) – Politecnico di Milano

### National and international activities

#### Institutional and organization activities for the Politecnico di Milano

- In February 2016 he organises the EURADOS Annual Meeting in Milano
- Since 2008, member of the CCS (Council of Course of Study) in Nuclear Engineering.
- From 2004 to 2009, member of the CCS (Council of Course of Studies) in Energy Engineering.
- In January 2003 he was appointed member of the Commission of the University Radiation Risk position he still holds.
- From 2003 to 2008, member of the Academic Board of the PhD in "Science Research and Radiation Technology", set up at the Department of Nuclear Engineering.
- From 2002 to present deals with the organization of the degree course in nuclear engineering
- In April 2001 he was appointed scientific advisor Unit Qualification and Training Unit and the Centre Calibration Centre for Quality of the University.
- In February 2000 he was appointed scientific advisor of the Center for Quality of the University.
- Since 1998 he is responsible for the Ionizing Radiation Area of the Calibration Centre at the Politecnico di Milano.
- As a radiation protection officer of the Department of Nuclear Engineering, performs radiation protection measures on large medical equipment such as linear accelerators and cyclotrons for PET;
- In 1994 he participated to the operations of fuel extraction from the core of the nuclear reactor L 54 M, installed at the Department of Nuclear Engineering.

#### Other tasks and activities

In 2017 he was appointed as a member of the Programme Committee of the 2nd ERPRW (European Radiation Protection Research Week) on behalf of EURADOS

In 2016 he was elected in the council of the EURADOS

In 2013 he was appointed as an expert member in the group work UNI / CT 045 / SC 02 / WG 02 "Orphan sources in metal scrap" for the update of the national standard UNI 10897: 2013

From 2010 voting member of the European organization EURADOS Polytechnic and full member of WG11.

From 1999 he took part, on behalf of the Milan Polytechnic, for standardization activities at national (CEI and UNI) and international (IEC).

#### National and international projects

Prin 2007 Development of measurement techniques in pulsed neutron fields generated by medical accelerators and research with the use of detectors in nuclear tracks. Prot. 200782TBSM\_002. Role: Responsible Scientific Research Unit.

European Project: Marie Curie Initial Training Network Early Fellowship of the European Community's Seventh Framework Programme under contract number (PITN-GA-2011- 289198-

ARDENT). Role: Member of various managing board of the project and tutor of two Early Stage Researchers (ESRS).

### **Personal skills**

#### Languages

Italian: mother language

English: Verbal: good - Reading: good – writing: good

Elementary knowledge of French

#### Information technology tools

- Good knowledge of Windows and Mac-os systems.
- Advanced knowledge of MS-Office, include macro programming.
- Scientific programming and development of computing codes using Matlab and Labview.
- Advanced knowledge of Labview for data acquisition and analysis.
- Advanced knowledge of the standard IT tools (e-mail, cloud, remote monitoring, document sharing etc.)

#### Social / communication

- Open-minded inclined to harmonize different points of view, to pursuit shared solutions.
- Friendly character, particularly inclined to foster feedback from staff and to pursuit a bottom-up approach to problem solving.
- Strongly convinced that the listening capability is the best attitude towards collaborators, at any level.
- Familiar with the organization of work in an international context (EURADOS and European project).
- Good experience in scientific dissemination and outreach.

## **List of publication – Marco Caresana**

### **Papers**

- [RI 1] Caresana M., Zorloni G. Preliminary study of silica aerogel as a gas-equivalent material in ionization chambers. Nuclear Inst. and Methods in Physics Research, A 874 (2017) 35–42
- [RI 2] M. Caresana, A. Parravicini, S. Coria, A. Stabilini, F. Assenmacher and E.G. Yukihiro. Comparison of padc neutron detectors from different suppliers. Radiation Protection Dosimetry (2017), pp. 1–5 doi:10.1093/rpd/ncx193
- [RI 3] Cassell C., Ferrarini M., Rosenfeld A., Caresana M. (2015). A novel technique for compensation of space charge effects in the LUPIN-II detector. Nuclear instruments & methods in physics research. Section a, accelerators, spectrometers, detectors and associated equipment, vol. 804, p. 113-117, doi: 10.1016/j.nima.2015.09.062
- [RI 4] C. A. Federico, O. L. Gonçalez, L. V. E. Caldas, M. T. Pazianotto, C. Dyer, M. Caresana, A Hands. Radiation Measurements Onboard Aircraft in the South Atlantic region (2015). Radiation Measurements, vol. 82, p. 14-20. doi: 10.1016/j.radmeas.2015.07.008



- [RI 5] Caresana, M., Garlati, L., Murtas, F., Romano, S., Severino, C.T., Silari, M. Real-time measurements of radon activity with the Timepix-based RADONLITE and RADONPIX detectors (2014) *Journal of Instrumentation*, 9 (11), DOI: 10.1088/1748-0221/9/11/P11023
- [RI 6] Agosteo, S., Anania, M.P., Caresana, M., Cirrone, G.A.P., De Martinis, C., Delle Side, D., Fazzi, A., Gatti, G., Giove, D., Giulietti, D., Gizzi, L.A., Labate, L., Londrillo, P., Maggiore, M., Nassisi, V., Sinigardi, S., Tramontana, A., Schillaci, F., Scuderi, V., Turchetti, G., Varoli, V., Velardi, L. The LILIA (laser induced light ions acceleration) experiment at LNF (2014) *Nuclear Instruments and Methods in Physics Research, Section B: Beam Interactions with Materials and Atoms*, 331, pp. 15-19. DOI: 10.1016/j.nimb.2013.12.035
- [RI 7] Caresana, M., Denker, A., Esposito, A., Ferrarini, M., Golnik, N., Hohmann, E., Leuschner, A., Luszik-Bhadra, M., Manessi, G., Mayer, S., Ott, K., Röhrich, J., Silari, M., Trompier, F., Volnhals, M., Wielunski, M. Intercomparison of radiation protection instrumentation in a pulsed neutron field (2014) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 737, pp. 203-213 DOI: 10.1016/j.nima.2013.11.073
- [RI 8] Aza, E., Caresana, M., Cassell, C., Charitonidis, N., Harrouch, E., Manessi, G.P., Pangallo, M., Perrin, D., Samara, E., Silari, M. Instrument intercomparison in the pulsed neutron fields at the CERN HiRadMat facility (2014) *Radiation Measurements*, 61, pp. 25-32. DOI: 10.1016/j.radmeas.2013.12.009
- [RI 9] Caresana, M., Cassell, C., Ferrarini, M., Hohmann, E., Manessi, G.P., Mayer, S., Silari, M., Varoli, V. A new version of the LUPIN detector: Improvements and latest experimental verification (2014) *Review of Scientific Instruments*, 85 (6). DOI: 10.1063/1.4879936
- [RI 10] Trompier, F., Boschung, M., Buffler, A., Domingo, C., Cale, E., Chevallier, M.-A., Esposito, A., Ferrarini, M., Geduld, D.R., Hager, L., Hohmann, E., Mayer, S., Musso, A., Romero-Esposito, M., Röttger, S., Smit, F.D., Sashala Naik, A., Tanner, R., Wissmann, F., Caresana, M. A comparison of the response of PADC neutron dosimeters in high-energy neutron fields (2014) *Radiation Protection Dosimetry*, 161 (1-4), pp. 78-81. DOI: 10.1093/rpd/nct275
- [RI 11] Caresana, M., Ferrarini, M., Parravicini, A., Sashala Naik, A. Dose measurements with CR-39 detectors at the CERF reference facility at CERN (2014) *Radiation Measurements*, 71, pp. 502-504. DOI: 10.1016/j.radmeas.2014.04.010
- [RI 12] Caresana, M., Ferrarini, M., Parravicini, A., Sashala Naik, A. Calibration of a passive rem counter with monoenergetic neutrons (2014) *Radiation Measurements*, 71, pp. 498-501. DOI: 10.1016/j.radmeas.2014.07.019
- [RI 13] Caresana, M., Ferrarini, M., Parravicini, A., Sashala Naik, A. Evaluation of a personal and environmental dosimeter based on CR-39 track detectors in quasi-monoenergetic neutron fields (2014) *Radiation Protection Dosimetry*, 161 (1-4), pp. 100-103. DOI: 10.1093/rpd/nct320
- [RI 14] Caresana, M., Helmecke, M., Kubancak, J., Manessi, G.P., Ott, K., Scherpelz, R., Silari, M. Instrument intercomparison in the high-energy mixed field at the cern-eu reference field (CERF) facility (2014) *Radiation Protection Dosimetry*, 161 (1-4), pp. 67-72. DOI: 10.1093/rpd/nct312
- [RI 15] Aza, E., Caresana, M., Cassell, C., Colombo, V., Damjanovic, S., Gilardoni, S., Manessi, G.P., Pangallo, M., Perrin, D., Silari, M. Comparison of the performance of different instruments in the stray neutron field around the cern proton synchrotron (2014) *Radiation Protection Dosimetry*, 161 (1-4), pp. 190-195. DOI: 10.1093/rpd/nct215

- [RI 16] Di Fulvio, A., Tana, L., Caresana, M., D'Agostino, E., De San Pedro, M., Domingo, C., D'Errico, F. Clinical simulations of prostate radiotherapy using BOMAB-like phantoms: Results for neutrons (2013) *Radiation Measurements*, 57, pp. 48-61. DOI: 10.1016/j.radmeas.2013.06.012
- [RI 17] Caresana, M., Ferrarini, M., Manessi, G.P., Silari, M., Varoli, V. LUPIN, a new instrument for pulsed neutron fields (2013) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 712, pp. 15-26. DOI: 10.1016/j.nima.2013.01.060
- [RI 18] Di Fulvio, A., Domingo, C., De San Pedro, M., D'Agostino, E., Caresana, M., Tana, L., D'Errico, F. Superheated emulsions and track etch detectors for photoneutron measurements (2013) *Radiation Measurements*, 57, pp. 19-28. DOI: 10.1016/j.radmeas.2012.11.022
- [RI 19] Agosteo, S., Bedogni, R., Caresana, M., Charitonidis, N., Chiti, M., Esposito, A., Ferrarini, M., Severino, C., Silari, M. Characterization of extended range Bonner Sphere Spectrometers in the CERF high-energy broad neutron field at CERN (2012) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 694, pp. 55-68. DOI: 10.1016/j.nima.2012.06.055
- [RI 20] Caresana, M., Ferrarini, M., Fuerstner, M., Mayer, S. Determination of LET in PADC detectors through the measurement of track parameters (2012) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 683, pp. 8-15. DOI: 10.1016/j.nima.2012.04.071
- [RI 21] Caresana, M., Ferrarini, M., Porta, A., Campi, F. Performance evaluation of a radiator degrader CR39 based neutron spectrometer (2012) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 680, pp. 155-160. DOI: 10.1016/j.nima.2012.02.050
- [RI 22] Caresana, M., Ferrarini, M., Garlati, L., Parravicini, A. Further studies on ageing and fading of CR39 PADC track detectors used as air radon concentration measurement devices (2011) *Radiation Measurements*, 46 (10), pp. 1160-1167. DOI: 10.1016/j.radmeas.2011.07.040
- [RI 23] Agosteo, S., Caresana, M., Ferrarini, M., Silari, M. A dual-detector extended range rem-counter (2010) *Radiation Measurements*, 45 (10), pp. 1217-1219. DOI: 10.1016/j.radmeas.2010.05.002
- [RI 24] Caresana, M., Ferrarini, M. Performance evaluation of a new reading technique of LR115 cellulose nitrate track detectors (2010) *Radiation Measurements*, 45 (8), pp. 911-915. DOI: 10.1016/j.radmeas.2010.06.003
- [RI 25] Caresana, M., Ferrarini, M., Pola, A., Agosteo, S., Campi, F., Porta, A. Study of a radiator degrader CR39 based neutron spectrometer (2010) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 620 (2-3), pp. 368-374. DOI: 10.1016/j.nima.2010.03.105
- [RI 26] Ferrarini, M., Varoli, V., Favalli, A., Caresana, M., Pedersen, B. A wide dynamic range BF3 neutron monitor with front-end electronics based on a logarithmic amplifier (2010) *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 613 (2), pp. 272-276. DOI: 10.1016/j.nima.2009.11.078

- [RI 27] Caresana, M., Ferrarini, M., Garlati, L., Parravicini, A. About ageing and fading of Cr-39 PADC track detectors used as air radon concentration measurement devices (2010) *Radiation Measurements*, 45 (2), pp. 183-189. DOI: 10.1016/j.radmeas.2010.01.030
- [RI 28] Leonardi, F., Caresana, M., D'Alessandro, M., Mishra, R., Tonnarini, S., Trevisi, R., Veschetti, M. An extended study of the etching characteristics of CR-39 detectors (2009) *Radiation Measurements*, 44 (9-10), pp. 787-790. DOI: 10.1016/j.radmeas.2009.10.026
- [RI 29] Agosteo, S., Caresana, M., Ferrarini, M., Silari, M. A passive rem counter based on CR39 SSNTD coupled with a boron converter (2009) *Radiation Measurements*, 44 (9-10), pp. 985-987. DOI: 10.1016/j.radmeas.2009.10.053
- [RI 30] Silari, M., Agosteo, S., Beck, P., Bedogni, R., Cale, E., Caresana, M., Domingo, C., Donadille, L., Dubourg, N., Esposito, A., Fehrenbacher, G., Fernández, F., Ferrarini, M., Fiechtner, A., Fuchs, A., García, M.J., Golnik, N., Gutermuth, F., Khurana, S., Klages, Th., Latocha, M., Mares, V., Mayer, S., Radon, T., Reithmeier, H., Rollet, S., Roos, H., Rühm, W., Sandri, S., Schardt, D., Simmer, G., Spurný, F., Trompier, F., Villa-Grasa, C., Weitzenegger, E., Wiegel, B., Wielunski, M., Wissmann, F., Zechner, A., Zielczyński, M. Intercomparison of radiation protection devices in a high-energy stray neutron field. Part III: Instrument response (2009) *Radiation Measurements*, 44 (7-8), pp. 673-691. DOI: 10.1016/j.radmeas.2009.05.005
- [RI 31] Wiegel, B., Agosteo, S., Bedogni, R., Caresana, M., Esposito, A., Fehrenbacher, G., Ferrarini, M., Hohmann, E., Hranitzky, C., Kasper, A., Khurana, S., Mares, V., Reginatto, M., Rollet, S., Rühm, W., Schardt, D., Silari, M., Simmer, G., Weitzenegger, E. Intercomparison of radiation protection devices in a high-energy stray neutron field, Part II: Bonner sphere spectrometry (2009) *Radiation Measurements*, 44 (7-8), pp. 660-672. DOI: 10.1016/j.radmeas.2009.03.026
- [RI 32] Porta, A., Agosteo, S., Campi, F., Caresana, M. Double-differential spectra of secondary particles from hadrons on tissue equivalent targets(2008) *Radiation Protection Dosimetry*, 132 (1), pp. 29-41. DOI: 10.1093/rpd/ncn273
- [RI 33] Caresana, M., Agosteo, S., Campi, F., Ferrarini, M., Porta, A., Silari, M. Sensitivity study of CR39 track detector in an extended range Bonner sphere spectrometer (2007) *Radiation Protection Dosimetry*, 126 (1-4), pp. 310-313. DOI: 10.1093/rpd/ncm064
- [RI 34] Porta, A., Agosteo, S., Campi, F., Caresana, M. Comparative performance tests of the FLUKA-RQMD system and EPAX 2 previsions vs. experimental data (2006) *Radiation Protection Dosimetry*, 121 (3), pp. 211-220. DOI: 10.1093/rpd/ncl031
- [RI 35] Rusconi, R., Forte, M., Caresana, M., Bellinzona, S., Cazzaniga, M.T., Sgorbati, G. The evaluation of uncertainty in low-level LSC measurements of water samples (2006) *Applied Radiation and Isotopes*, 64 (10-11), pp. 1124-1129. DOI: 10.1016/j.apradiso.2006.02.006
- [RI 36] Caresana, M., Fazzi, A., Varoli, V. Feasibility study of a personal dosimeter based upon silicon diodes used in remote controlling (2005) *Radiation Protection Dosimetry*, 114 (4), pp. 469-474. DOI: 10.1093/rpd/nch490
- [RI 37] Caresana, M., Campi, F., Ferrarini, M. Evaluation of etching correction factor for LR115 cellulose nitrate films from track parameters (2005) *Radiation Protection Dosimetry*, 113 (4), pp. 354-358. DOI: 10.1093/rpd/nch485
- [RI 38] Caresana, M., Campi, F., Ferrarini, M., Garlati, L., Porta, A. Uncertainties evaluation for electrets based devices used in radon detection (2005) *Radiation Protection Dosimetry*, 113 (1), pp. 64-69. DOI: 10.1093/rpd/nch420

- [RI 39] Campi, F., Caresana, M., Ferrarini, M., Garlati, L., Palermo, M., Rusconi, R. Uncertainty evaluation of radon measurements with LR115 detector and spark counter (2004) *Radiation Protection Dosimetry*, 111 (1), pp. 59-64. DOI: 10.1093/rpd/nch361
- [RI 40] Lanza, A., Vitulo, P., Cattaneo, C., Caresana, M., Panetsos, F. Behaviour of feed-forward neural networks in invariant track finding (1994) *Computer Physics Communications*, 79 (3), pp. 364-372. DOI: 10.1016/0010-4655(94)90182-1
- [RI 41] Alonso, J., Caresana, M., Lanza, A., Panetsos, F., Rios, J. A DSP based board for neural network simulation (1991) *Microprocessing and Microprogramming*, 29 (5), pp. 263-271. DOI: 10.1016/0165-6074(91)90001-A

### National congress

- [PN 1] M.Caresana, M.Ferrarini, A.Parravicini. (2008). *Analisi morfologica delle tracce nucleari su rivelatori cr-39*. Cinquantenario AIRP: Storia e Prospettive della Radioprotezione. Pisa, 4 – 6 giugno 2008. 2008. (pp. 145-154). ISBN/ISSN: 88-88648-07-0.
- [PN 2] Abate S, Capogni M, M.Caresana, De Felice P, Garlati L, Marzulli V, Minchillo G, Puerari G, Romani S, Tambussi O, Tofani A, Toni M.P. (2007). *Stato di avanzamento dell'attività di definizione e verifica sperimentale di procedure di taratura dei contaminometri*. Convegno Nazionale di Radioprotezione: Sicurezza e qualità in radioprotezione. Vasto Marina,. 1 – 3 ottobre 2007. ISBN/ISSN: 88-88648-06-2.
- [PN 3] M.Caresana, M.Ferrarini, S.Agosteo. (2006). *Costruzione di un sistema di sfere di bonner modificato utilizzando rivelatori di cr39*. XXXIII Congresso AIRP. Torino. 20-23 Settembre 2006. ISBN/ISSN: 88-88648-03-8.
- [PN 4] S.Abate, A.Boccolini, M.Capogni, M.Caresana, P.De Felice, L.Garlati, V.Marzulli, G.Minchillo, G.Puerari, S.Romani, O.Tambussi, A.Tofani, M.P.Toni. (2006). *Riferibilità ai campioni primari e procedure di taratura dei contaminometri*. XXXIII Congresso AIRP. Torino. 20-23 Settembre 2006. ISBN/ISSN: 88-88648-03-8. : (ITALY).
- [PN 5] V. Klamert, M. Caresana, S. Abate, O. Tambussi (2005) *La applicabilità della norma UNI sulla verifica della incertezza totale nella determinazione dell'equivalente di dose personale per il corpo intero con dosimetri per raggi x e gamma*. convegno nazionale A.I.R.P. ISBN 88-88648-03-8.
- [PN 6] L. Garlati, A.A. Porta, F. Campi, M. Caresana (2005) *Prove di esalazione su campioni di materiali utilizzati nell'edilizia*. convegno nazionale A.I.R.P. ISBN 88-88648-03-8.
- [PN 7] F. Campi, M. Caresana, M. Ferrarini, A. Parravicini (2005) *Misura del fattore di correzione per l'attacco chimico di film Ir115 attraverso l'analisi della forma delle tracce*. convegno nazionale A.I.R.P. ISBN 88-88648-03-8.
- [PN 8] M. Caresana, L. Garlati, V. Klamert. (2003). *Misure di radon in luoghi di lavoro sotterranei: un esempio di misurazioni*. XXXII congresso nazionale AIRP ISBN 88-88648-08-9.
- [PN 9] M. Caresana, L. Garlati (2003). *Realizzazione di una camera ad atmosfera controllata di radon*. III congresso italiano Metrologia & Qualità

- [PN 10] M. Caresana, L. Garlati (2002). *Caratterizzazione delle camere a ionizzazione basate sull'impiego degli elettretti per la valutazione della componente gamma del fondo ambientale e per la misura della concentrazione di radon*. Congresso S.I.R.R.
- [PN 11] M. Caresana, V. Klamert, G. Minchillo, O. Tambussi *Analisi della risposta angolare del dosimetro fotografico in termini di Hp(d)* (2001) convegno nazionale AIRP.
- [PN 12] M. Caresana, V. Klamert, G. Minchillo, O. Tambussi *Riferibilità a grandezze dosimetriche operative di dosimetri passivi* II Congresso Italiano di Metrologia & Qualità. Milano, 20-22 febbraio 2001.
- [PN 13] M. Caresana, L. Garlati *Riferibilità metrologica alla grandezza kerma in aria di camere a ionizzazione basate sull'impiego degli elettretti* (2001) convegno nazionale AIRP.
- [PN 14] M. Caresana G. Minchillo, M. Pirovano. (2000) *Misure di densità ottica di pellicole fotografiche per dosimetria mediante una telecamera CCD* XXXI Congresso Nazionale AIRP. S.P.I.100 European Communities, 2000.
- [PN 15] M. Caresana, V. Klamert *Sviluppo di un interfaccia per acquisizione ed analisi dati da un lettore manuale per rivelatori TL* (1993) XXVIII Congresso Nazionale AIRP

### **International congress**

- [PI 1] M. Caresana, M. Ferrarini - Neutron dosimetry in pulsed and mixed fields for hadrontherapy applications. SATIF-13, Dresden 2016.
- [PI 2] M. Caresana<sup>1</sup>, M. Ballerini, D. Garf Ulfbeck, N. Hertel, G. Manessi, C. Søgaard. Pulsed neutron fields measurements around a synchrotron storage ring. 13<sup>th</sup> International Conference on Radiation Shielding (ICRS-13) Paris 2016
- [PI 3] M. Caresana, G. Manessi, M. Silari - Radiation measurements in pulsed neutron fields - 10th International Workshop on Ionizing Radiation Monitoring, Oarai, Japan 2015
- [PI 4] C. Cassell, M. Ferrarini, G. M. Manessi and M. Caresana LUPIN, a novel rem counter for synchrotron facilities. - Eighth International Workshop on Radiation Safety at Synchrotron Radiation Sources Hamburg, Germany 2015
- [PI 5] M. Caresana, S. Rollet, M. Ferrarini, A. Sashala Naik, A. Parravicini Monte Carlo simulations for neutron dosimetry and spectrometry using CR-39 track detectors. MMND-IPCT conference 2014 Port Douglas Australia.
- [PI 6] C. Cassell, M. Caresana, M. Ferrarini Dosimetry of Pulsed Neutron Radiation Fields MMND-IPCT conference 2014 Port Douglas Australia.
- [PI 7] C. A. Cassell, M. Caresana, M. Ferrarini, E. Hohmann, G. P. Manessi, S. Mayer, M. Silari, V. Varoli A Novel Neutron Gamma Discrimination Technique for the New LUPIN Pulsed Neutron Detector (oral presentation) IEEE 2013 Nuclear Science Symposium and Medical Imaging Conference – Seoul
- [PI 8] M. Caresana, L. Garlati, F. Murtas, C. T. Severino, M. Silari. A Novel Neutron Gamma Discrimination Technique for the New LUPIN Pulsed Neutron Detector (oral presentation) IEEE 2013 Nuclear Science Symposium and Medical Imaging Conference – Seoul

- [PI 9] M. Caresana, A. Sashala Naik, S. Rollet, M. Ferrarini. Simulation of Neutron Dosimetry with CR-39 Track Detectors and Comparison Against Experimental Calibration Campaigns (oral presentation) IEEE 2013 Nuclear Science Symposium and Medical Imaging Conference – Seoul
- [PI 10] Manessi, G.P., Welsch, C., Caresana, M., Ferrarini, M. The lupin detector: Supporting least intrusive beam monitoring technique through neutron detection (2013) IBIC 2013: Proceedings of the 2nd International Beam Instrumentation Conference, pp. 648-651.
- [PI 11] A.A. Porta, F. Campi, L. Garlati, M. Caresana. (2003). *A method for C-14 specific Activity Detection in gas-graphite reactor moderator based on CO<sub>2</sub> "in situ" generation and trapping* proceedings APHY 2003, ISBN 0-08-044648-5.
- [PI 12] F. Campi, M. Caresana, M. Ferrarini, L. Garlati, R. Rusconi, M. Palermo, L. Salvadori, L. Verdi *Radon data from different laboratories: an Italian intercomparison* proceedings APHY 2003, ISBN 0-08-044648-5
- [PI 13] V. Klamert, M. Caresana, G. Minchillo, O. Tambussi (2002) *Determination of eye lenses dose equivalent in terms of Hp(3)* European IRPA Congress. ISBN/ISSN: 88-88648-09-7.
- [PI 14] M. Caresana, V. Klamert. (2002). *Evaluation, by simulated exposures, of a dose algorithm for photographic dosimetry for X and gamma radiation* European IRPA Congress. ISBN/ISSN: 88-88648-09-7.
- [PI 15] F. Campi, M. Caresana, S. Terrani, A. Corsini, A. Gandellini. *Prove di sensibilità sui monitori portatili impiegati per il controllo radiometrico dei carichi di rottame* Radioproteccion – Revista del la Sociedad Española de Protección Radiológica – n° Extraordinario Mayo 1998 302-304 ISBN/ISSN: 1133-1747.
- [PI 16] F. Campi, M. Caresana, S. Terrani, A. Corsini, A. Gandellini. *Protocollo di prova per i portali strumentati destinati al controllo radiometrico dei carichi di rottame all'ingresso degli impianti di utilizzo* Radioproteccion – Revista del la Sociedad Española de Protección Radiológica – n° Extraordinario Mayo 1998 262-264 ISBN/ISSN: 1133-1747.

### Contribution in Books

- [CV 1] Campi, F., Caresana, M., Ferrarini, M., Garlati, L., Palermo, M., Rusconi, R., Salvadori, L., Verdi, L. Radon data from different laboratories. An italian intercomparison (2005) Recent Advances in Multidisciplinary Applied Physics, pp. 879-885. DOI: 10.1016/B978-008044648-6.50131-2 DOCUMENT TYPE: Book Chapter
- [CV 2] Porta, A.A., Campi, F., Garlati, L., Caresana, M. A method for C-14 specific activity detection in gas - graphite reactor moderators based on CO<sub>2</sub> "in situ" generation and trapping (2005) Recent Advances in Multidisciplinary Applied Physics, pp. 789-793. DOI: 10.1016/B978-008044648-6.50120-8 DOCUMENT TYPE: Book Chapter

### Patent

- [B 1] M. Caresana, F. Campi, M. Ferrarini. (2004). Metodo e dispositivo di lettura di dosimetri passivi a traccia. M12004A001620. POLITECNICO DI MILANO. Diritti esclusivi ceduti alla società MiAm nel febbraio 2005, a seguito di accordo commerciale tra la stessa ed il Politecnico di Milano.

### Altro

- [A 1] M. Caresana, S. Gilardoni, F. Malacrida, G.P. Manessi, M. Silari (2012). Environmental measurements and instrument intercomparison around the PS accelerator complex - CERN-DGS-2012-036-RP-TN. p. 1-21
- [A 2] A. Lanza, M. Caresana A DSP based processor for high rate data analysis and reduction INFN internal report INFN/TC-89/9 (1989).