

## Rita Bernabei – Short Curriculum Vitae

### I – Generalities

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*World's Top 2% Scientists* <https://web.uniroma2.it/it/contenuto/worlds-top-2-scientists-90-i-ricercatori-e-le-ricercatrici-di-tor-vergata-tra-i-migliori-scientisti-del-mondo>  
*A web site:* <https://bernabei.users.roma2.infn.it/>  
*Spoken languages:* Italian, English

### II – Education

- She attended the "Augusto" classical high school in Rome, gaining scholarships from the Rome Education Authority.
- She obtained her classical high school diploma in July 1968, with the best final averaged profit score: 8.1/10.
- She attended the degree course in Physics at the Rome "La Sapienza" Univ., gaining some study grants from the Univ.
- On July 19, 1973 she obtained the laurea in Physics at the Rome "La Sapienza" Univ. with the score 110/110.
- On April 28, 1977 she obtained the laurea in Mathematics at the Rome "La Sapienza" Univ. with the score 110/110 cum laude.

### III – Job positions

- In the academic year 1973/74 she taught at the evening seminars of electronic calculators for working students of Mathematics and Physics at the Faculty of MFN Sciences of the University of Rome La Sapienza, and was tutor.
- From 12/1/1974 to 8/30/1975 she held a C.N.R. grant for postgraduates at the MFN Sciences Fac. of the Univ. of Rome La Sapienza.
- From 1/9/1975 to 23/7/1980 she held a scientific and didactic training grant from the Ministry of Public Education at the Fac. of MFN Sciences Fac. of the Univ. of Rome La Sapienza, with renewal on 09/01/1977 and subsequent extension.
- From 1/4/1980 to 31/10/1980 she was substitute professor of Experimental Physics I course at the MFN Sciences Fac. of the Univ. of Rome La Sapienza.

- From 24/7/1980 to 20/2/1983 she was tenured assistant to the chair of General Physics II, titular Prof. G. Salvini (president of the examination commission Prof. E. Amaldi) at the MFN Sciences Fac. of the Univ. of Rome La Sapienza.
- From 2/21/1983 to 10/31/1986 she was permanent Associate Professor of Physics Experimentation II at the MFN Sciences Fac. of the Univ. of Rome La Sapienza.
- From 11/1/1986 to 10/31/2007 she was Associate Professor of Experimentation of Physics I, having won the competition for transfer, at the MFN Sciences Fac. of the Univ. of Rome Tor Vergata.
- From 11/1/2007 to 10/31/2019 she is Full Professor in the FIS04 sector – Nuclear and Subnuclear Physics at the MFN Sciences Fac. of the Univ. of Rome Tor Vergata and Dep. of Physics; she was retired on 10/31/2019 having reached the age limit.
- From 27/11/2019 she is holding the honorary position of "Docens Turris Virgatae" at the same university.

#### **IV – Some of the scientific/organizational activities**

- Representative of the permanent assistant professors in the M.F.N. Sciences Faculty of the Rome La Sapienza Univ. for about a year before being appointed Associate Professor at the same University.
- member of the Italian Physical Society.
- member of National Institute for Nuclear Physics Research as associate researcher for over 40 years
- Member - since 1989 for six consecutive years - of the National Scientific Commission V (Research and development) of the National Institute of Nuclear Physics (I.N.F.N.).
- Member of the Academic Board of the Post-graduate School in Health Physics in the University of Rome Tor Vergata for many Academic years (A.A.)
- Member of the Academic Board of the Doctoral School in "Physics" in the University of Rome Tor Vergata for many academic years.
- Member of examination commissions for some university researcher competitions and for associate professor positions; member in 2019 of the commission of a competition for Full Professor at the Univ. of Rome La Sapienza.
- Member in 2010 and 2014 of the Commission for confirmation in the role of associate professors for the FIS04 sector - Nuclear and Subnuclear Physics.
- Member of the National Commission for the Confirmation in the role of researchers in the FIS04 - Nuclear and Subnuclear Physics sector in the period 2008-2010 and again in the period: 1 January 2014 - 31 December 2015.
- Member of the Disciplinary Commission of the Univ. Rome Tor Vergata. from April 2014 to December 2017.
- Member of the commission for the organization of the teaching of the Department of Physics of the University of Rome Tor Vergata since the A.A. 2012/2013 to 31/10/2019.
- Evaluator of national and international projects in various periods.
- Member of the scientific committees of many international conferences and workshops.
- Referee for numerous international scientific journals.

- Since 2012 she has been a member of the International Advisory Editorial Board of Nuclear Physics and Atomic Energy [ISSN: 1818-331X (Print), 2074-0565 (Online)].
- Since 2016 she has been a member of the editorial board of the international journals: International Journal of Modern Physics A (Particles and Fields; Gravitation; Cosmology) [ISSN (print): 0217-751X | ISSN (online): 1793-656X] and Modern Physics Letters A (Particles and Fields; Gravitation; Cosmology and Nuclear Physics) [ISSN (print): 0217-7323 | ISSN (online): 1793-6632].
- Since 2018 she has been a member of the editorial board of the international magazine: Universe (ISSN 2218-1997).
- Since 1990 she has been the national responsible (joined after 2018) for INFN and always the international spokesperson - having also been the main promoter - of the international collaboration DAMA (Italian and Chinese researchers) and DAMA-Kiev, which develops new scintillators and intrinsic low background apparatuses and carries out experiments at the Gran Sasso National Laboratories of the I.N.F.N. for the direct study of many rare nuclear processes and of particle dark matter.
- Promoter in the past of the proposed inter-university agreement between the Univ. of Rome Tor Vergata and the ITT–Kharagpur, India.
- Promoter of the inter-university agreement signed at the time by the Rector of the University of Rome Tor Vergata and the representatives of the University of Jingtangshan, Ji'an, Jiangxi, P.R. China
- Responsible for I.N.F.N., university (60%) and M.A.E. research funds.

## V – Publications

She is co-author/author of more than 500 publications (mostly by few authors) in scientific journals and volumes of Proceedings (see e.g. in the MIUR teachers website), some informative texts and some educational volumes (2 for high schools and one adopted from 1977 to 1987 as the textbook of the courses of electronic calculators for mathematicians and physicists at the University of Rome La Sapienza), etc..

The Citation Summary and Objective Parameters as of beginning of 2024 from **Google Scholar** My Citations is: **H-index = 82 totale; total citations = 29386; i10-index: 219.**

## VI – Main teaching activities

She has taught at the Degree Courses in Physics and Mathematics, in postgraduate Schools of Health Physics and in Physics PhD schools. In particular, until 10/31/1986 her teaching activity listed below was carried out at the Rome La Sapienza Univ. and the subsequent one at the Rome Tor Vergata Univ., unless otherwise stated:

- 1973/74 academic year: a) Evening course of Electronic Calculators for students of Mathematics and of Physics; b) Exercise course of Electronic Calculators; c) Exercise course of Advanced Algebra for physicists.
- 1974/75: a) Exercise course of Physics Laboratory I; b) Exercise course of Electronic Calculators; c) Exercise course of Advanced Algebra for physicists.
- 1975/76: a) Exercise course of Physics Laboratory I; b) Exercise course of Advanced Algebra for physicists.
- 1976/77: a) Exercise course of Physics Experimentation II; b) Exercise course of Advanced Algebra for physicists.

- 1977/78: a) Exercise course of Physics Experimentation II; b) Exercise course of Advanced Algebra for physicists.
- 1978/79: a) Exercise course of Physics Experimentation I; b) Exercise course of Electronic Calculators; c) Exercise course of Advanced Algebra for physicists.
- 1979/80: a) Exercise course of Physics Experimentation II; b) Exercise course of Advanced Algebra for Physicists; c) Exercise course in General Physics I for mathematicians; d) Member of the Examination Commission of Electronic Calculators.
- 1980/81: a) Course of Physics Experimentation II; b) Exercise course of Electronic Calculators; c) Exercise course of Advanced Algebra for physicists.
- 1981/82: a) Course of Physics Experimentation I.
- 1982/83: a) Course of Physics Experimentation II; b) Half Course of Physics Experimentation II (evening course); c) Member of the Examination Boards for Physics Experimentation I.
- 1983/84: a) Course of Physics Experimentation II; b) Exercise course of Physics Experimentation II; c) Course of Nuclear Physics II at the Physics specialization school; d) Member of the Examination Boards for Physics Experimentation I.
- 1984/85: a) Course of Physics Experimentation II; b) Exercise course of Physics Experimentation II; c) course of Nuclear Physics II at the Physics specialization school; d) Alternate President of the Examination Board of Health Physics for physicists; e) Member of the examination commission for the admission of foreign students to the degree courses of the M.F.N. Sciences Faculty; f) Member of the examination commissions of Physics Experimentation I.
- 1985/86 a) Physics Experimentation Course II; b) Course in Health Physics; c) Member of the examination commission for the admission of foreign students to the degree courses of the Faculty of Sciences M.F.N.; d) Member of the Examination Boards for Physics Experimentation I.
- 1986/87: a) Course of Physics Experimentation II (A-K) as substitute teacher, at the Rome La Sapienza Univ.; b) Teaching task as associate professor transferred to the Rome Tor Vergata Univ.: organization of the first two-year laboratories in the new SOGENE headquarters; c) Member of the examination commissions of Physics Experimentation courses for physicists and of Physics for Biologists at the University of Rome Tor Vergata; d) Member of the examination commissions of the Physics Experimentation courses at the Rome La Sapienza Univ.
- 1987/88: a) Course of Physics Experimentation II; b) Course of Physics Complements at the school of specialization in Health Physics; c) Member of the examination Commission of the Physics course for biologists.
- 1988/89: a) Course of Physics Experimentation I; b) Course of Statistical methods applied to biomedicine at the school of specialization in Health Physics; c) Member of the examination commission of the Physics course for biologists.
- 1989/90: a) Course of Physics Experimentation II; b) course of Instrumentation at the postgraduate school of specialization in Health Physics; c) Member of the Commission for the examination of the Physics course for biologists.
- 1990/91: a) Course of Physics Laboratory II; b) course of Instrumentation at the postgraduate school of specialization in Health Physics.
- 1991/92: a) Course of Physics Laboratory II.
- 1992/93: a) Course of Physics Laboratory II; b) Member of the teaching board of the PhD school in Physics.
- 1993/94: a) Physics Laboratory II course; b) member of the teaching board of the PhD school in Physics.
- 1994/95: on leave of absence for study reasons.
- 1995/96: a) Course of Physics Laboratory II; b) member of the teaching board of the PhD school in Physics.
- 1996/97: a) Course of Physics Experimentation I; b) member of the teaching board of the PhD school in Physics.
- 1997/98: a) Course of Physics Experimentation II; b) Course of Nuclear and Subnuclear Physics

Laboratory.

- 1998/99: a) Course of Physics Experimentation I; b) course of 'Experimental methodologies for the search for rare events' at the PhD school in Physics.
- 1999/2000: a) Course of Physics Experimentation II; b) course of 'Solar neutrinos: detection techniques, results and implications' at the PhD school in Physics.
- 2000/2001: a) Course of Physics Experimentation I.
- 2001/2002: a) course of Physics Laboratory II; b) course of Physics Laboratory III; c) member of the teaching board of the PhD school in Physics.
- 2002/2003: a) course of Physics Laboratory I; b) Course of Experimental Physics for mathematicians; c) member of the teaching board of the PhD school in Physics.
- 2003/2004: a) course of Physics Laboratory II; b) member of the teaching board of the PhD school in Physics.
- 2004/2005: a) course of Physics Laboratory I; b) Course of Experimental Physics for mathematicians; c) member of the teaching board of the PhD school in Physics.
- 2005/2006: a) course of Physics Laboratory II; b) course of Experimental Physics for mathematicians; c) course of Radioactivity.
- 2006/2007: a) course of Physics Laboratory I; b) course of Experimental Physics for mathematicians; c) course of Radioactivity.
- 2007/2008: a) course of Physics Laboratory II; b) course of Experimental Physics for mathematicians; c) course of Experimental methodologies for the research of rare processes for the specialistic degree in Nuclear and Subnuclear Physics; d) course of Radioactivity; e) tutor of training internships of 8 C.F.U. each.
- 2008/2009: a) course of Physics Laboratory I; b) course of Experimental Physics for mathematicians; c) course of Experimental methodologies for the research of rare processes for the specialist degree in Nuclear and Subnuclear Physics; d) course of Radioactivity.
- 2009/2010: a) course of Physics Laboratory II; b) course of Physics Experimentation (Mathematics and Computer Science degree courses); c) course of Radioactivity.
- 2010/2011: a) Course of Physics Laboratory I (Physics and FAM degree courses); b) course of Physics Experimentation Laboratory (Mathematics and Computer Science degree courses); c) course of Radioactivity.
- 2011/2012: a) Course of Physics Laboratory II (Physics and FAM degree courses); b) course of Physics Experimental Laboratory for mathematicians; c) course of Radioactivity; d) course of Physics and experimental topics in underground laboratories: Dark Matter, rare processes and neutrino physics (PhD school in Physics).
- 2012/2013: a) course of Elements of Nuclear and Subnuclear Physics; b) course of Radioactivity, for both degrees in Italian and English languages; c) course of Astroparticle Physics; d) course of Physics and experimental topics in underground laboratories: Dark Matter, rare processes and neutrino physics (PhD school in Physics).
- 2013/2014: a) course of Elements of Nuclear and Subnuclear Physics; b) course of Radioactivity, for both degrees in Italian and English languages; c) course of Astroparticle Physics; d) course on Physics problems and experimental topics in underground laboratories: Dark Matter, rare processes and neutrino physics (PhD school in Physics); e) course of Dark Matter with scintillators at the international PhD school in Physics of the GSSI, L'Aquila.
- 2014/2015: a) Course of Elements of Nuclear and Subnuclear Physics; b) course of Radioactivity, for both degrees in Italian and English languages; c) course of Astroparticle Physics; d) Member of the teaching board of the PhD school in Physics.
- 2015/2016: a) course of Elements of Nuclear and Subnuclear Physics; b) course of Radioactivity, for both degrees in Italian and English languages (in co-teaching with a visiting professor); c) course of Astroparticle Physics; d) Member of the teaching board of the PhD school in Physics.
- 2016/2017: a) course of Elements of Nuclear and Subnuclear Physics; b) course of Radioactivity, for both degrees in Italian and English languages (in co-teaching with a visiting professor); c)

- Astroparticle Physics course; d) member of the teaching board of the PhD school in Physics.
- 2017/2018: a) course of Elements of Nuclear and Subnuclear Physics; b) Radioactivity course, for both degrees in Italian and English languages (in co-teaching with a visiting professor); c) Astroparticle Physics course; d) Member of the teaching board of the PhD school in Physics; e) tutor of two training internships of 6 C.F.U. each.
  - 2018/2019: a) course of Elements of Nuclear and Subnuclear Physics; b) course of Astroparticle Physics; c) Member of the teaching board of the PhD school in Physics.
  - 2019/2020: a) course of Experimental Methodologies for the Research of Rare Processes.

She has also been over the years:

- supervisor of many degree and PhD theses in Physics;
- tutor of many training internships of 8 or 6 C.F.U. regarding topics inherent or connected with Nuclear and Subnuclear Physics, and Astroparticle Physics;
- tutor of Physics students;
- member of Commissions of the Final Examination of the PhD in Physics at Italian and foreign universities, in particular at the national and international doctorate of the University of L'Aquila (Italy), the University of Zaragoza (Spain), the University of Liège (Belgium).

## VII – Some Acknowledgments

- Award for scientific industriousness of the S.I.F. in 1979, reserved for graduates after 1972.
- Honorary position “ Docens Turris Virgatae” in 27/11/2019.
- Member of the organizing committee of various international workshops and of parallel sessions at international conferences
- Member of numerous international scientific committees of international congresses and workshops.
- Evaluator of national and international projects in various periods.
- Member of editorial boards of scientific journals
- Referee of many international journals).

## VIII – Congresses

Among the many activities carried out, it should be noted in particular that:

- she has been invited speaker in many national and international congresses and seminars, e.g. in China, Russia, USA, India, South Africa, Japan, Europe; and also in some international schools.
- in September 1992 she was one of the organizers and teachers of a school on the problem of dark matter of the Universe at the IHEP of Beijing (China).
- in June 1993 and November 1995 she was the promoter of the international workshops The dark side of the Universe: experimental efforts and theoretical framework I and II at the INFN section and Physics Department of the University of Roma Tor Vergata, and edited the volumes of proceedings published by World Scie..
- she was a member of the international scientific committee of the workshops: “Dark matter”: DM98, DM2000 and DM2002 in Los Angeles (USA);
- she was a member of the organizing committee of the conference "Physics for the 21st century" in Rome "Tor Vergata" in the year of the Jubilee;
- she has been a member of the international scientific committee of the “Identification of Dark Matter” workshops since the first IDM96 (UK) to IDM2018 (USA), every two years.
- In 1995 she was member of the organizing committee of the international workshop Topics in Astroparticle and Underground Physics (TAUP95) in Zaragoza in Spain; and was then a member of the International Advisory Committee of all the international workshops of the series (biennial) until 2018;

- In 2012 she was chair of the AP1 parallel session on topics related to Dark Matter of 13 Marcel Grossman meetings in Sweden; in 2018 she was chair of the parallel session DM2 (Dark Matter and rare processes) of the 15th Marcel Grossman meeting in Rome; in 2021 she was a chair of the DM6 section (Dark Matter and rare processes) of the 16 Marcel Grossman virtual meeting.

## **IX – Laboratories and visits**

Her scientific activity has mainly been focused on issues of Nuclear and Subnuclear Physics and Astroparticle Physics; in particular, in the late 80s she was among those who in Italy started experimental activities in the field of the so-called Astroparticle Physics, later in great expansion. Experiments, to which she contributed, have had international resonance. Her main scientific activities were carried out: 1) at the Frascati National Laboratories (LNF) of the INFN: M.E.A. at the collider e+e- Adone in the period 1975-78 and experiments with the monochromatic and polarized photon beam LADON in the period 1982-89; 2) at the proton-antiproton collider at CERN in Geneva: UA1 experiment in the period 1978-82; 3) at the INFN Gran Sasso National Laboratories: experiments on solar neutrinos GALLEX in the period 1985-1997 and GNO in the period 1997-2005; moreover, she was the main proponent and is the national (with a national co-responsible after 2018) and the international responsible for the international DAMA project, which has created many different intrinsic low-background devices (DAMA/NaI, DAMA/LIBRA, DAMA/R&D, DAMA/ LXe, DAMA/Ge, DAMA/CRYST) and experimental measurements on various rare processes. Furthermore, various activities were carried out at the university Institute/Departments and INFN sections to which she belonged. She also carried out an extensive development activity of detectors and apparatus with innovative characteristics within her various research activities.

She has visited many Italian and foreign research centers and universities; in particular, she remember the period as a guest at the University of Niteroi and CBPF in Rio de Janeiro in 1987, the one in India in 2013 and the one as a guest at the University of Jinggangshan, Ji'an, Jiangxi, P.R. China in 2015.

## **X – Brief summary of the main research activities**

- 1973-1978 (date on which the activity of ADONE in the field of high energy physics was interrupted) – In this period, after having contributed to an analysis of data collected at Adone from the experiment “ $\mu\pi$ ” directed by prof. M. Conversi, she contributed to the collection and analysis of data from the MEA experiment (Magnet Experiment at Adone) at LNF directed by Profs. L Paoluzi (her reference prof. in the MPI grant) and M. Nigro. The topics of research concerned the study of multi-hadron production in various aspects and that of the form factors of  $\pi$  and  $k$ . In 1977 she also contributed to the proposal of a new experiment at Adone: DIANA, for which she contributed to the study and creation of Cerenkov counters, later used in the  $\gamma\text{-}\gamma\text{-}2$  experiment, DIANA having been shelved in the interest of continuing the work and analysis of existing experiments.
- July 1978-May 1982 – She was one of the proponents of the INFN PBARP activity for the Italian participation in the UA1 experiment for the study of the very high energy proton-antiproton interaction at the CERN collider in Geneva. During these years she collaborated in the implementation of the "very forward" part of the apparatus, in software development and data analysis. The research topics developed in this period concerned – in addition to technological developments – the study of the multiplicity distribution of charged particles, the search for centaur-like events, the distribution of transverse impulses of charged and neutral particles, the study of small angle scattering, the study of the transverse energy in the calorimeters of the central detector.

- 1982-1989 (up to the conclusion of the experiment) – In this period, having decided to return to work in Italy, she collaborates with the Ladon group on activities at the LNF monochromatic and polarized photon beam. The main developed topics of research were: a) measurement of the asymmetry factor of the photodisintegration cross section of deuterium as a function of the energy of the incident photons; b) study of angular distributions and comparisons with various theoretical models; c) study of the giant resonance properties of  $^{28}\text{Si}$ ; d) high precision measurement of the total photodisintegration cross section of deuterium in the energy range (14.7 – 74) MeV, deepening the knowledge of the details of the short range nucleon-nucleon interaction; e) measurement of the cross section  $^4\text{He}(\gamma, p)^3\text{H}$  in the energy range 28.6 – 58.1 MeV, not observing any violation of the charge symmetry, predicted instead by some pre-existing phenomenological analyses; f) measurement of the photofission cross section of  $^{238}\text{U}$ ,  $^{197}\text{Au}$ ,  $^{\text{nat}}\text{Pb}$  and  $^{209}\text{Bi}$ ; g) preliminary study on the feasibility of Ladon photon beams with tagging; h) measurement of the total cross section  $^3\text{He}(\gamma, p)$ ; g) realization of a cryogenic target for liquid hydrogen and helium; l) various analyzes on phenomenological aspects of few-body systems and the quasi-deuteron model. She contributed to data collection and analysis; she had particular responsibility in the design, construction and management of the high pressure apparatus used for the experiments in points d), e) and h) and in the tests of the cryogenic target in point i). The photon beam, however, was inoperative since the summer of 1987 to allow the necessary work on Adone for its return as an  $e^+e^-$  accumulation ring. Various phenomenological studies were also carried out and published during this period.

In 1989, following the interest born around the possibility of triggering cold fusion, she contributed to an experiment - carried out at the Physics Department of the University of Rome "Tor Vergata" - for the measurement of any neutrons produced during the evolution of the deuterated precipitation in Nb, Ta, Ti, contributing to the setting up of the experimental apparatus, to the taking and analysis of the data; the measurement did not show neutron production above the background

Finally, from 1988 to June 1989 she contributed to some initial studies connected with the development of the software necessary for the Wizard project, proposed by some colleagues already involved in the experiments at the Ladon beam.

- 1989-1991 (entire duration of the experiment) – She contributed to the proposal and to the work of the Xelidon experiment, funded by the National Scientific Committee V of the I.N.F.N., for the feasibility study of liquid xenon detectors, contributing to the project and realization of various prototypes at the Tor Vergata laboratory, and to studies concerning the applicability of these detectors in various fields of Physics.
- 1985-1997 (entire duration of the experiment) – She was one of the proponents of the Italian participation in the GALLEX international experiment (Gallium experiment) on the measurement of the solar neutrino flux at the Gran Sasso National Laboratories of the INFN and participated in the experiment up to its conclusion. The purpose of the GALLEX experiment was to contribute — with higher statistical significance and mainly with a lower energy threshold — to the understanding of the so-called "solar neutrino puzzle", by exploring for the first time the pp neutrinos for which theoretical estimates were better determined and less dependent on astrophysical models. The experiment was installed in 1990 and the first test runs began in the middle of that year. The results have been regularly reported in international journals. The last extraction of solar neutrino runs was carried out in January 1997. The experiment ended in 1997 having achieved its objectives. The measured solar neutrino flux turned out to be lower than that expected from the standard solar model, however showing how the main bases of the astrophysical models of energy



production in the stars are substantially correct and how the solar neutrino problem must affect the neutrino properties, such as neutrino oscillations and the MSW effect. The experimental result has therefore given impetus to a considerable further work in the field, both as regards the theoretical-phenomenological part of the problem and for the focus on the characteristics that must be peculiar to new experiments. Furthermore, various experiments dedicated to verify the absolute reliability of the results obtained with the used radiochemical technique were carried out within the activities. In particular, the GALLEX collaboration has carried out the complete calibration of the experiment twice, realizing and using the most intense artificial neutrino source ever produced, with an activity greater than 60 PBq. Furthermore, at the end of the measurement, further verification tests were carried out using  $^{71}\text{Ge}$  produced in-situ from the beta decay of  $^{71}\text{As}$ . In this experiment, she contributed to the preparation and set-up of the experimental apparatus for the measurements of the muon- and neutron-induced backgrounds in the underground laboratory, as well as to the apparatus installation, data collection and some aspects of their analysis.

- 1996-2005 (entire duration of the experiment) – She is part of the international collaboration GNO (Gallium Neutrino Observatory) continuing the research on solar neutrinos. The GNO experiment (which began taking data in April 1998) set out to measure the interaction rate of low-energy solar neutrinos on gallium with better accuracy than the previous GALLEX experiment. For this purpose, the target of 30 tons of gallium already used in GALLEX was used with a significantly renewed set-up as regards the counting station, the electronics and the DAQ. The systematic error obtained at the end of the measurement was lower than that of the GALLEX experiment as it was the purpose of the experiment. The GNO experiment confirmed the lack of low-energy solar neutrinos already highlighted by GALLEX and contributed to the evaluation of the neutrino oscillation parameters credited to explain the solar neutrino deficit observed by all the experiments. In that activity she contributed in particular to the initial installation of some parts of the hardware and to some stages of data collection.
- 1990-today (from the beginning to today) – In 1990 she was the principal proponent and then the national responsible (with co-responsible after 2018) and always the spokesperson of the DAMA project (Roma2, Rome, LNGS, IHEP-Beijing; on some specific activities with INR-Kiev and colleagues from other foreign institutions). This experiment operates as an observatory for rare processes and had as its primary purpose the investigation of the particle Dark Matter component of the Universe through the development and use of highly radiopure scintillators. Over the years, many R&D developments and many experimental set-ups have been carried out. In particular, many different studies have been performed on candidate particles as dark matter in the Universe, on double beta decay processes in many isotopes, on rare nuclear processes, on the search for exotic matter, on possible processes that do not conserve electric charge, on possible decay of the nucleon, di-nucleon and tri-nucleon into invisible channels, on possible processes of violation of the Pauli Exclusion Principle, on solar axions, etc. Furthermore, she has worked on the development of innovative and peculiar detectors, such as e.g. possible use of anisotropic scintillators in the study of the directionality induced by dark matter particles. The DAMA project achieved many competitive results and, in particular, obtained significant model-independent evidence of the presence of dark matter particles in the galactic halo using highly radio-pure NaI(Tl) target-detector set-ups, large exposures (several tons per year) and on the basis of the methodological approach known as Dark Matter annual modulation of the signal. Various measures and developments are considered.

Among the other activities in various periods, she also mention the various measurements relating to problems of Health Physics and Radioactivity, the development of various types of detectors, the

studies for some reviews and phenomenological analyses, the didactic activities (books, handouts, some popular publications), etc.

Rome 15/2/2024