

## CURRICULUM VITAE PROF. CELESTINA SATRIANO

Surname: SATRIANO

Name: Celestina

Current position: Associate Professor of Physics at the Department of Sciences of the University of Basilicata .

### Employment History

- a) Degree in Physics from the University of Naples in 1984, score 110/110, with a thesis entitled "Dipolar geoelectrical prospecting for deep geological-structural studies in Basilicata";
- b) external collaborator at the Department of Geophysics and Volcanology of the University of Naples in 1984;
- c) contract researcher in the framework of the Convention between the University of Naples and the Campania Region "Bradisism and Connected Phenomena " in 1985 and 1986;
- d) winner of a scholarship awarded by the Basilicata Region for research work at the Institute of Physics of the University of Basilicata in 1986;
- e) appointed Mathematics and Physics professor for High Schools in October 1987;
- f) external collaborator at the Institute of Physics of the University of Basilicata in 1988;
- g) from 1990 to 2002 Experimental Physics researcher at the Faculty of Sciences of the University of Basilicata;
- h) since May 1991 associated at the INFN Section of Rome;
- i) from 2002 on associate professor of Experimental Physics (FIS/01) at the Faculty of Sciences of University of Basilicata;
- l) since February 2007 research associate at the INFN Section of Rome.

### Teaching Activities

Since 1990 Satriano has been in charge every year of 1 or 2 courses of Physics 1, Physics 2 or Physics Lab at the University of Basilicata .

She is component of the commission of examination for the courses of Physics I and Physics II held at the Faculty/Department of Sciences of University of Basilicata.

She participated in committees for examining Degrees in Biotechnology and the examination for the Master Degrees in Plant Biotechnology at the University of Basilicata.

### Collegial and organizational activities

- In January 1992 she was appointed researcher representative on the Board of the Degree Course in Chemistry for the biennium 1991/1993;
- In February 1993 he was appointed member of the Scientific Commission (02) "Physical Sciences" responsible for examining applications for funding for scientific research ;
- In November 1995 he was appointed as representative of the Council of the researchers in the Faculty of Sciences for the academic period 1995/97;
- In October 1999 she was appointed member of the Scientific Committee of the Interfaculty Centre for Telematics and Information Services for the period 1998/2002 as a representative of the Faculty of Sciences;
- In January 2001 she was appointed member of the Commission for the evaluation of research carried out by holders of research grants;

- In February 2001 she was appointed Head of the research in the physics laboratory of the detectors, pursuant to art. 5 of the Ministerial Decree of 05.08.2000, n.363;
- has been appointed member of the Scientific Committee of the Interfaculty Centre for Telematics and Information Services for the period 2002/2006 as a representative of the Faculty of Sciences;
- has been a member of the Commission for the evaluation of research carried out by holders of research grants from January 2001 to November 2004;
- is responsible for the research in the physics laboratory of detectors 1 at the Department of Chemistry since February 2001;
- since March 2003 she was responsible for the teaching and research in the laboratories of the Physics and Detectors 2 Laboratory of Mechanical CAD at the Department of Chemistry;
- has been scientific coordinator of the research program of the University entitled "Physics of the detectors" in 2002;
- has been scientific coordinator of the research program of the University entitled "Physics of the detectors" in 2004;
- has been appointed Head of the initiative ORI-output orientation, within the Project Lorenz in 2007.

### Scientific Activities

Celestina Satriano has carried out her research activities mainly in the field of experimental physics. After getting her degree the scientific activity was devoted to the development of methodologies and techniques for geophysical exploration of the subsoil.

Since the starting of her work (1990) at the University of Basilicata Satriano, integrating with the research teams working at the Faculty of Sciences, collaborated with Prof. Auriemma in research projects mainly devoted to Particle Astrophysics, muons astronomy and gamma rays. In this context, since 1991 has been a member of the MACRO (Monopole, Astrophysics and Cosmic Rays Observatory) Collaboration. Later she started working in the field of High Energy Physics joining the LHCb Collaboration at CERN, a research project devoted to the measurement of CP violation.

Satriano is co-author of more than 180 papers on international refereed journals.

The main research activities were:

- *Methods for the geophysical exploration of the geo-electric subsurface*

After graduation, the scientific activity was carried out in the field of Physics of the Solid Earth. A portable instrument was designed and built for the acquisition and processing of geo-electric data. It was also addressed to the problem of extracting the signal from the time series of geophysical parameters characterized by a low signal to noise ratio.

In 1988 she collaborated with the Institute of Physics of the University of Basilicata, working on methods and techniques for analyzing time series of geophysical data in seismically active areas. In particular, advanced statistical methods in the analysis of electrical seismic precursors for the identification of extreme events has been applied.

- *MACRO experiment at Gran Sasso*

MACRO was a large area underground experiment located in the Gran Sasso tunnel (Central

Italy). The primary objective of the experiment was the search for magnetic monopoles, other priority was to study the emission of neutrinos in the early moments of a stellar collapse.

Satriano, as part of the collaboration, has been concerned, in particular, with the muon astronomy. A search for sources of muons detected with the MACRO experiment was performed. The results seem to exclude any evidence for "anomalies" in the production of muons in electromagnetic showers.

Satriano has developed and applied a new technique that involves the analysis of events reconstructed as muon pairs to highlight anisotropies in the flux of these particles, indicating anomalous production of muons generated by primary point sources.

An important parameter for the search of cosmic sources is also a perfect knowledge of the resolution of the apparatus used and any pointing errors. For this purpose has been carried out a careful study for the detection of the effect of the screen to cosmic rays produced from the moon on the apparatus.

Particular attention has been paid also in the determination of the vertical intensity of muons measured by MACRO, subsequently used for the calculation of the flow of muons on the surface. The seasonal variations of the intensity of the flux of muons at a depth of MACRO was analyzed then correlated with seasonal variations in temperature of the atmosphere.

In the last years of the experiment life the analysis of muons coming from the lower part of the apparatus produced by interaction of neutrinos was performed. The main objectives of this work have been the search for possible point sources of neutrinos and neutrino oscillations.

#### *- SINGAO Project*

As part of SINGAO Consortium, Satriano was involved, in relation to European research network "COSMICEURO", in the search of a site for an array operating above  $10^{19}$  eV and participated to the preparation of the proposal submitted to the INFN.

#### *- GAMT Collaboration*

Satriano was also a member of the GAMT (Gamma-ray Air-Cherenkov Multiple Telescope) Collaboration. She was involved in the study of the feasibility of a high resolution multitelescope for detecting discrete cosmic sources of gamma rays by means of Cherenkov light in the range from 0.1 to 5 TeV.

#### *- LHCb Collaboration*

Since 1999, Satriano is part of the LHCb collaboration which designed and built an experimental apparatus for the measurement of CP violation that is currently installed at CERN and uses the large accelerator LHC. In this context she faced, in collaboration with the group of INFN Rome1, the study of the system for the identification of muons produced in the decay of B mesons. The group studied the technical characteristics of detectors made with TGC (Thin Gap Chambers) and with MWPC (Multiwire Proportional Chambers). These last ones were selected for the mu subsystem, after that innovative materials have been proposed and tested at the University of Basilicata. The construction of the detectors MWPC has placed great technical problems because of the duty cycle of LHC (20 ns), and of the stringent request of a very high temporal resolution for the MWPC chambers. Furthermore the chambers will have to operate for at least 10 years subjected to strong radiation (estimated dose of about 1 Mrad in 10 years). This required a very thorough study of the physics of the detector itself and of the front-end electronics. In particular, Satriano contributed to the definition of TDR (Technical Design Report) for the muon subsystem and participated to the study and testing of the front-end electronics, in addition to the study of the aging, under irradiation, of composite panels that were to be used in the construction of the chambers,

and the study of propagation properties of gas mixtures used in the chambers themselves. This last aspect was investigated in an independent research on the physics of gaseous detectors.

Satriano was the person in charge of the laboratories “Physics of Detectors 1” and “Physics of Detectors 2” at the University of Basilicata in which the necessary panels of the MWPC chambers to be installed at CERN were prepared.

Satriano has participated regularly, at CERN in Geneva, to the tests of the MWPC chambers before they were permanently mounted on the apparatus.

In the period before the starting of the LHC accelerator, waiting the first real data from the experiment, she participated in the activities related to the software using simulated data for the development of analysis programs.

Then she began the analysis of real data to verify the possibility of detecting and successfully reconstruct the hadronic jets with the LHCb apparatus. Having obtained positive results she is analyzing the entire set of real data with the objective of measuring the differential cross section for the production of high energy hadronic jets, a measure which represents a fundamental test for the perturbative QCD (pQCD).