PROCEEDINGS OF SCIENCE

Preface

Paolo Castorina
Dipartimento di Fisica e Astronomia, Università di Catania and INFN sezione di Catania
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Paolo.Castorina@ct.infn.it

Francesco Catara
Dipartimento di Fisica e Astronomia, Università di Catania and INFN sezione di Catania
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Francesco.Catara@ct.infn.it

Salvatore Lo Nigro
Dipartimento di Fisica e Astronomia, Università di Catania and INFN sezione di Catania
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Salvatore.Lonigro@ct.infn.it

Emilio Migneco
Dipartimento di Fisica e Astronomia, Università di Catania and LNS-INFN
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Migneco@lns.infn.it

Francesco Porto
Dipartimento di Fisica e Astronomia, Università di Catania and LNS-INFN
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Francesco.Porto@ct.infn.it

Andrea Rapisarda
Dipartimento di Fisica e Astronomia, Università di Catania and INFN sezione di Catania
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Andrea.Rapisarda@ct.infn.it

Emanuele Rimini
Dipartimento di Fisica e Astronomia, Università di Catania
Via S. Sofia 64, I-95123 Catania, Italy
E-mail: Emanuele.Rimini@ct.infn.it

Ettore Majorana's legacy and the Physics of the XXI century
University of Catania, Italy
5-6 October, 2006

PoS(EMC2006)018

Ettore Majorana was born in Catania on the 5th of August 1906. On the occasion of the centennial of his birth, it was natural to celebrate this anniversary in his town. The Majorana family belongs to the history of Catania and has given politicians, ministers, University rectors, but Ettore, son of Fabio Majorana, was probably the one who gave the most important contributions to his field and who, unfortunately, is famous more for his mysterious disappearance than for his fundamental scientific activity. The reason lies in the fact that he was very reluctant to publish his own results and that the majority of his papers, during his short academic career, were published only in Italian. This is one of the reasons why we decided to organize this conference in his home town and invite well-known physicists to illustrate, 100 years after his birth, Ettore Majorana's key contributions to physics and in particular his legacy to contemporary research. The conference was held at the Department of Physics and Astronomy of the University of Catania, on the 5th and the 6th of October 2006 in the Aula Magna, that was dedicated to Majorana just in that occasion. More than 100 participants, coming from Italy and abroad, attended the lectures. Most of them were young physicists. The conference was opened by Antonino Zichichi, President of the Ettore Majorana Foundation in Erice, who illustrated the genius of Ettore and the relevance of his research to contemporary physics. The personality and the teaching activity during the last period in Naples were presented by Erasmo Recami (Majorana's main biographer) Bruno Preziosi and Salvatore Esposito. Roman Jackiw and Roberto Casalbuoni discussed the important contribution that Ettore gave to the mechanism of mass generation and to field theory with the infinite components wave equation. David Brink described the Majorana exchange term in nuclear forces, while Massimo Inguscio, Renato Pucci and Antonio Bianconi presented the Majorana's seminal papers on atomic physics and in particular on the spin-flip, on the Thomas-Fermi approximation and on Feshbach resonances, which, even today, are basic for very important applications. Rosario Mantegna discussed the last paper by Ettore, published after his disappearance, where he presented his original and modern views about the important role that statistical physics can play in social sciences, and where once again he revealed to be a pioneer. Finally, the last part of the conference was dedicated to the neutrino and to the possibility that it could be a Majorana particle, i.e. a particle identical to its anti-particle,

which is a very important point in contemporary particle physics. This last topic was discussed by Ettore Fiorini, Luciano Maiani, Roberto Petronzio, presently President of the Italian National Institute for Nuclear Physics (INFN), Emilio Migneco and Nicola Cabibbo. These proceedings include also a contribution by Giorgio Dragoni, who explains the close collaboration that Ettore had with his uncle Quirino Majorana, a well known experimental physicist, in the years before his disappearance.

In conclusion, we think that the conference was quite successful. New facets of Ettore Majorana's life and scientific activity emerged. It represented also a unique opportunity to remind the fundamental role of Majorana not only during his times, but also for contemporary physics, where his legacy is still alive and present. We do hope that this book of proceedings and the collection of Majorana's original papers, published this year by the Italian Physical Society both in Italian and in English [1], will help in giving to Ettore Majorana the due acknowledgment that he deserves and that has been unfortunately forgotten for too long.

References

[1] *Ettore Majorana, Scientific Papers, on occasion of the centenary of his birth*, Edited by G.F. Bassani and the Council of the Italian Physical Society, SIF and Springer (2006).