IL NUOVO CIMENTO **47 C** (2024) 344
DOI 10.1393/ncc/i2024-24344-0

Colloquia: MAYORANA 2023

Preface

C. Agodi(2), F. Cappuzzello(1)(2), R. Caruso(1)(3) and M. Cavallaro(2)

(1) *Dipartimento di Fisica e Astronomia "Ettore Majorana", Università di Catania Catania, Italy*
(2) *INFN, Laboratori Nazionali del Sud - Catania, Italy*
(3) *INFN, Sezione di Catania - Catania, Italy*

received 6 August 2024

The first edition of the MAYORANA (Multi-Aspect Young ORiented Advanced Neutrino Academy) School&Workshop was hosted in the wonderful town of Modica (Sicily, Italy) at the historical Palazzo Grimaldi from 4 to 14 July 2023. It has been jointly organized by the University of Catania, Istituto Nazionale di Fisica Nucleare, and Fondazione Grimaldi. The main objective of the MAYORANA School&Workshop is to promote a collaborative framework of young and senior researchers from the fields of nuclear, particle, and astroparticle neutrino physics to discuss theories and experiments in which interdisciplinary aspects are particularly relevant. The overlap between different communities is an unavoidable, although demanding, feature to face several challenges of modern fundamental physics. The sharing of different experimental and theoretical techniques, the exchange of technical experiences and know-how is perhaps the best resource to build a unified view of the aforementioned scientific topics. The event was structured in two main meeting formats. The first week was dedicated to an advanced school, addressed to doctoral students, post-doctoral fellows, and young researchers from all over the world. More than thirty young participants of different nationalities from universities and research institutions in Italy, United States, Germany, France, the Netherlands, China, Finland, and Poland attended the school. The school training activities were carried out by 9 professors of the highest scientific profile from prestigious institutions in the United States, Germany, Switzerland, Spain, Italy, Argentina, Finland. Dedicated sessions through posters and mini-talks presented by the students and face-to-face discussions with the professors were also organized during the school. Two prizes have been awarded to the two best mini-talks and posters evaluated by an appropriate committee of experts. The second part of the event consisted of an international workshop of scientists, also open to young scholars, in which the most innovative results in the current research panorama were presented. The aim was to connect researchers from different communities to discuss recent results and challenges of modern neutrino physics. The workshop was animated by about 60 top-level scientists from Italy, United States, Germany, France, Poland, Finland, Sweden, China, Spain, Slovakia, Belgium, and the Netherlands. During the MAYORANA School&Workshop opening ceremony, a public lecture, open to the city, entitled "The Majorana neutrino, a bridge between matter and antimatter" was held by Prof. Francesco Vissani, research director of Laboratori Nazionali del Gran Sasso, Istituto Nazionale di Fisica Nucleare, a very prestigious personality

Creative Commons Attribution 4.0 License (https://creativecommons.org/licenses/by/4.0)

in the field of neutrino physics. The opening ceremony was hosted at the fascinating Garibaldi theatre in Modica in the presence of scientific, academic and civil authorities, including the Rector of the University of Catania Francesco Priolo and the Minister of the Italian Republic Nello Musumeci, who were welcomed by the Mayor of Modica Maria Monisteri. The list of the topics discussed during the MAYORANA School&Workshop included:

- double beta decay,
- nuclear structure in connection with neutrino physics,
- neutrino nucleus interactions at low and high energy,
- nuclear reactions for weak interactions,
- supernova models and detection of supernovae neutrinos,
- solar models,
- direct and undirect dark matter searches,
- rare beta decay of nuclei for neutrino mass measurement,
- neutrino oscillation and matter effect,
- anomalies in reactor neutrinos,
- ultra high energy astroparticle neutrinos,
- new related detection technologies,
- artificial intelligence for DAQ and data analysis.

Additional information about the MAYORANA School&Workshop, including program details and presentation materials, is available at `https://agenda.infn.it/e/mayorana23`.