

PREFACE OF THE BOOK SERIES EDITORS

The Proceedings of the 11th International Conferences on Advanced Technology and Particle Physics (ICATTP) on "Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications" is part - as the 5th volume - of the new book series on "Astroparticle, Particle, Space Physics, Radiation Interaction, Detectors and Medical Physics Applications". These proceedings are also available as ebooks and eproceedings. The inclusion of the Conference Proceedings is aimed at allowing participants that present articles at ICATTP conferences - particularly, PhD students and Postdoctoral Fellows - to increase their number of citations once their manuscripts are accepted for publication in the Conference Proceedings. Being published and available electronically, the articles have a DOI registration-number, a long-term retention and accessibility which increase the chances of these works being cited. Furthermore, these articles are (or in the process of be) accounted for in databases, like that of ISIWEB of knowledge. The Proceedings of the 7th, 8th, 9th and 10th Conferences are the first four volumes of the book series.

The ICATTP conferences are dedicated to physics requirements, survey of technologies and performance of detectors employed (or to be employed) in fundamental and particle physics experiments at accelerators, underground laboratories, submarine facilities, and in space environments for astroparticle physics experiments and astrophysics research, special applications like medical imaging, radiotherapy, software for dose estimate in radiotherapy, radiation effects on devices, synchrotron radiation and new detectors. Presentations usually include the following subjects: colliding beam machines, non accelerator facilities, space facilities, specialized detectors, calorimetry, tracking devices, particle identification, data transmission, data acquisition, semiconductors, medical applications, radiotherapy, radiation damage effects and software developments, including GEANT4 applications. These conferences are also aimed at promoting contacts among scientists involved in particle and fundamental physics, experimental physicists in other fields and representatives from industry.

The present book series is dedicated to an up-to-date coverage of investigations, physics requirements, survey of technologies and performance of detectors employed - or to be employed - in fundamental and particle physics experiments at accelerators, underground laboratories, submarine facilities, and in space environment - including Earth magnetosphere and heliosphere - for astroparticle and cosmic-ray physics experiments and astrophysics research, special applications like medical imaging, radiotherapy, simulation codes for dose estimates in radiotherapy, biological effects, radiation effects on devices, synchrotron radiation and new advanced detectors. The book series is, therefore, well suited for inclusion of these Proceedings.

Previously, the conference Proceedings were published as:

1st Conference: E. Borchi, T. Ferbel, A. Penzo and P.G. Rancoita (Editors), Proceedings of the 1st International Conference on Advanced Technology and Particle Physics, Como 13-17 June 1988, North Holland, Nucl. Instr and Meth. A 279, Nos 1,2 (1989);

2nd Conference: E. Borchi, T. Ferbel, D. Nygren, A. Penzo and P.G. Rancoita (Ed-

- itors), Proceedings of the 2nd International Conference on Advanced Technology and Particle Physics, Como 11-15 June 1990, North-Holland, Nucl. Phys. B (Proc. Supp.) 23A (1991);
- 3rd Conference: E. Borch, T. Ferbel, D. Nygren, A. Penzo and P.G. Rancoita (Editors), Proceedings of the 3rd International Conference on Advanced Technology and Particle Physics, Como 22-26 June 1992, North-Holland, Nucl. Phys. B (Proc. Supp.) 32 (1993);
- 4th Conference: E. Borch, J. Huston, S. Majewki, A. Penzo and P.G. Rancoita (Editors), Proceedings of the 4th International Conference on Advanced Technology and Particle Physics, Como 3-7 October 1994, North-Holland, Nucl. Phys. B (Proc. Supp.) 44 (1995);
- 5th Conference: E. Borch, J. Huston, S. Majewki, A. Penzo and P.G. Rancoita (Editors), Proceedings of the 5th International Conference on Advanced Technology and Particle Physics, Como 7-11 October 1996, North-Holland, Nucl. Phys. B (Proc. Supp.) 61 (1998);
- 6th Conference: E. Borch, J. Huston, S. Majewki, A. Penzo and P.G. Rancoita (Editors), Proceedings of the 6th International Conference on Advanced Technology and Particle Physics, Como 5-9 October 1998, North-Holland, Nucl. Phys. B (Proc. Supp.) 78 (1999).

Articles published in the Proceedings listed above are already accounted for in databases, like that of ISIWEB of knowledge.

The Book Series Editors

Claude Leroy and Pier-Giorgio Rancoita

December 2009

PREFACE TO PRESENT VOLUME

The exploration of the subnuclear world is done through increasingly complex experiments covering a wide range of energy and performed in a large variety of environments going from particle accelerators, underground detectors up to satellites and space laboratory. The achievement of these research programs calls for novel techniques, new materials and new instrumentation to be used in detectors, often of large scale. Therefore, particle physics is at the forefront of technological advance and also leads to many applications. Among these, medical applications have a particular importance due to health and social benefits they bring to the public. The International Conference on Advanced Technology and Particle Physics is held every two years. The Conference held during the week 5-9 October 2009 at the "Centro di Cultura Scientifica A. Volta" was the 11th Edition and again welcomed a large participation. There were more than 230 participants representing more than 150 institutions from 29 countries. The Participants were experienced researchers but also graduate students and recent postdoctoral fellows, students receiving financial support from the Conference organization.

The conference allows a regular review of the advances made in all technological aspects of the experiments at various stages, data taking, upgrade or in preparation. The open and flexible format of the Conference is conducive to fruitful exchanges of points of view among participants, permits the measure of the progresses made and indicate research directions. This year many contributions were reporting commissioning and cosmic data taken by the various experiments at LHC, showing their readiness for the coming physics phase.

The medical sessions gave an interesting example of merging advanced technology, particle physics and numerical techniques.

Plenary and parallel sessions covered:

- 1 Advanced Detectors and Particle Identification (organized by E. Nappi and J. Seguinot),
- 2 Astroparticle Physics and Underground Experiments (organized by A. Capone),
- 3 Space Experiments (organized by F. Favata),
- 4 Heliosphere and Earth Magnetosphere (organized by K. Kudela),
- 5 Calorimetry (organized by C. Leroy),
- 6 Software Applications (organized by P. Binko and S. Giani),
- 7 High Energy Physics Experiments (organized by L. Price and R. Ruchti),
- 8 Accelerator and Computer Data/Networking Developments (organized by R. Ruchti),
- 9 Medical Application Instrumentation (organized by S.Pospisil),
- 10 Radiotherapy and Medical Imaging (organized by V. Sossi),
- 11 Radiation Damage (organized by S. Baccaro) and

12 Tracking Devices (organized by D. Abbaneo).

Several rooms were dedicated to the poster exhibition organized by V. Hagopian. The posters were divided into three general categories as follows: i) Astroparticle, Underground Experiments, Space Physics and Cosmic Rays, ii) High-Energy Physics Experiments, Trackers, Calorimetry, Software and Data Systems and iii) Advanced Detectors and Medical Physics Applications. The poster papers accepted for publications have been included in the appropriate section of the Proceedings, as function of their topic. From the quality of the material of the posters, it is clear that a lot of effort went into their preparation making the posters a truly important part of this Conference.

The Article Committee - with Claude Leroy and Pier-Giorgio Rancoita - was set to follow the article submission, review and publication in the Conference Proceedings.

We would like to thank the staff of the Centro A. Volta for the excellent support provided to the Conference organization at Villa Olmo. In particular, we would like to extend our appreciation and thanks to the Secretariat of Centro di Cultura Scientifica A. Volta for their help and efficiency with the organization of the Conference and its running. The help of Pavel Bobik (Slovak Academy of Sciences, Kosice), Davide Grandi (INFN Milano-Bicocca) and Olivia Scallon (University of Montreal) in the preparation of the Conference proceedings is gratefully acknowledged.

The organizers would like to thank the strong support of INFN and ESA which made the conference possible.

Finally, we would like to thank the speakers for the high quality of their contributions and the participants for their enthusiasm in attending the Conference and contributing to the discussions.

Article and Organizing Committee

Claude Leroy
Pier-Giorgio Rancoita

Organizing Committee

Larry Price
Randal Ruchti

Industry Organizing Committee

Michele Barone
Andrea Gaddi