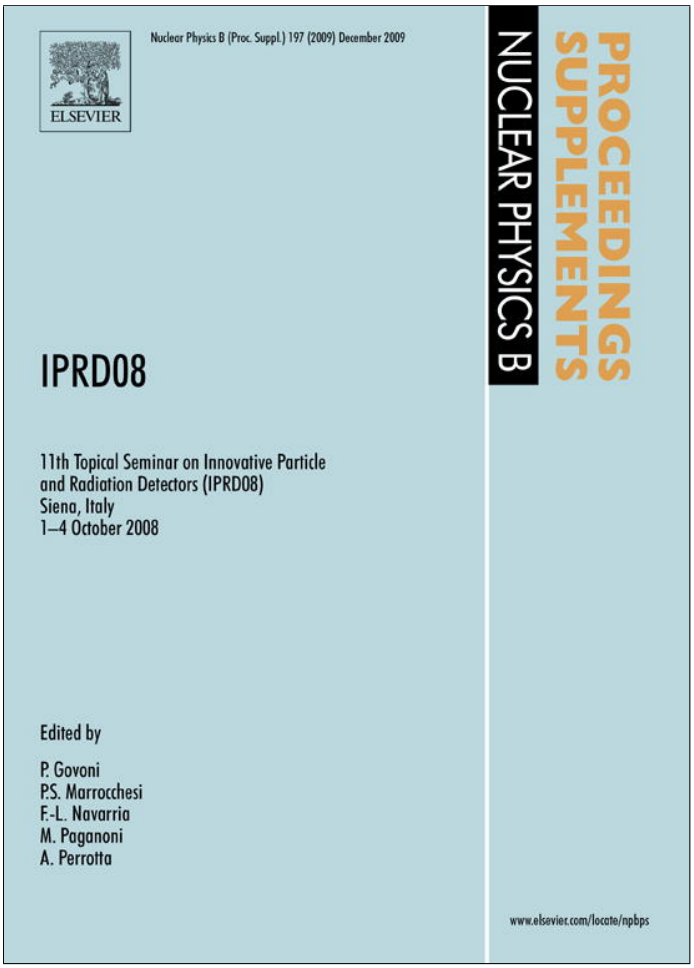

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There is more in our iron than meets the eye.
D. Jamnik and C. Zupancic, NA4 Collaboration internal note, 7 February 1980.
To strive, to seek, to find, and not to yield.
Alfred Tennyson, 1st Baron (1809–92), Ulysses.

Editorial

Astroparticle physics is blossoming. Exciting results for the ratio of antimatter/matter in cosmic rays have been recently reported. PAMELA detects an increase in the ratio $e^+/(e^+ + e^-)$ between 10–100 GeV, whilst ATIC sees a flattening or a hint of a structure in the $(e^+ + e^-)$ spectrum up to 600–700 GeV. Besides astrophysical explanations, that the particles are coming from young pulsars such as Geminga, this observation could be the first evidence for the existence of Dark Matter (DM). Many more experiments are looking for DM or will be doing it soon. They use all possible techniques, comprising different noble liquids, crystals, bolometers and even specially operated bubble chambers. With the exception of the DAMA/LIBRA experiment at the Gran Sasso underground laboratory, no experiment on earth is able to see any signal of DM interactions, and the limits set exclude larger and larger areas of the parameter space. On the ultra high energy side AUGER has detected several cosmic rays close to the Greisen-Kuzmin-Zatsepin (GKZ) bound, and the GKZ bound appears not to be violated. The first correlations between Ultra High Energy Cosmic Rays (UHECR) and known cosmic sources have also been produced. The AntiMatter Spectrometer (AMS02) on the International Space Stations (ISS) is ready and is going through extensive tests. Its flight is now scheduled for June 2010. Ice and sea water are used as high-energy neutrino detectors, with AMANDA becoming slowly IceCube, and ANTARES back on the stage after a fast recovery from a cable incident. Over the ice and the cold sea circumpolar balloons keep regularly flying. An applied use of cosmic radiation is meanwhile becoming fashionable. A few decades after the pioneering measurements of rock overburden in Australia by George and of the Chephren pyramid by Alvarez, high energy muons are used or planned in a variety of experiments: studies of hidden structures in pyramids in Latin America, radiography of volcanoes in Japan and later in Italy, screening of high Z material at borders for contraband detection, correlation between muon flux undergroud and temperature in the upper atmosphere. On the high energy frontier of man made radiation, the CERN Large Hadron Collider (LHC), shortly after a mediatic start-up with single injected beams on September 10 2008, has been stopped for repairs, following an incident on September 19. About fifty LHC magnets have been repaired and replaced as fast as possible, and the diagnostic and safety of the machine have been greatly improved. It is foreseen to restart the LHC in November 2009 and to operate it first at the injection energy (450 GeV). Only later the beams will be accelerated to 3.5 TeV, and then to higher energies. As a consequence of the incident all the schedule of the LHC, including the energy and luminosity upgrade, SuperLHC, has been stretched. Still the activity for the SLHC in the experiments is taking more importance everyday. The deployment of the World LHC Computing Grid (WLCG) is proceding well, with several successful data challenges being regularly made, and is foreseen to be completed before the first batch of high energy data, by the end of 2009. The Tevatron collider at Fermilab continues to take data and to integrate luminosity. Its sensitivity is already scraping the 160–170 GeV/c^2 region of

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the Higgs mass, but the road to evidence is predicted to be long, if not impossible, even if the Higgs should be there. Concerning e^+e^- machines, DAFNE is still operating, while projects for building a Super B factory near Rome are being presented. On the high energy side, studies of the International Linear Collider (ILC) are continuing and proposals for the construction of the detectors are perhaps to be filed by 2012. The CLIC option with somewhat higher energy is still being pursued as an R&D option at CERN: in any case the scenario for e^+e^- machine at high energy will be clearer only after the LHC has produced some results.

The 11th Topical Seminar on Innovative Particle and Radiation Detectors focused on advanced technologies in particle physics at collider experiments and in cosmic ray astrophysics experiments, with the emphasis on their increasing applications in other fields, in particular medicine and biology, and on the need for detailed detector simulation and new computing strategies. The main topics covered by the conference were: tracking detectors; calorimeters; detectors for X and γ-ray astrophysics; cosmic ray experiments in space, on the earth's surface, and underground; neutrino experiments; radiation-hard detectors and electronics; detectors for medicine and biology; large X-ray systems for security control; simulations and new computing methods. This was also the 21th Topical Seminar, in a series of conferences started in 1983 in San Miniato, which includes several subseries, namely on detectors, physics results and software. The four-day Seminar took place in October 2008 in the Auditorium of the Santa Chiara College of the University of Siena. The conference programme, addressing most of the topics, comprised 93 talks and 10 posters. Several review talks summarized the progress of complex projects and major facilities, shorter talks and posters covered contributions on specific items. The meeting was attended by about 120 physicists, representing more than 50 laboratories and coming from 11 different countries, and also by several representatives from italian industry.

The Seminar was sponsored and supported by CERN, the Italian Institute for Nuclear Physics (INFN), the Universities of Bologna and Siena, and the Electronics and Instrumentation Company CAEN. We would like to thank the sponsoring institutions who rendered the meeting possible and in particular: Dr. R. Aymar, CERN Director General, Prof. J. Engelen, CERN Chief Scientific Officer, Prof. R. Petronzio, President of the INFN, Prof. P. Capiluppi, Director of the Physics Department of the University of Bologna, Prof. P.U. Calzolari, Rector of the University of Bologna, Prof. S. Focardi, Rector of the University of Siena, and Prof. L. Moi, Director of the Physics Department of the University of Siena. We would also like to thank most warmly Dr. G. Lehmann of CERN for the help with scientific organization, the secretaries of the meeting, Ms. F. Pizzuto and Ms. G. Pasquini of the Servizio Congressi of the University of Siena, for a perfect local organization, and Mr. F. Papini of the Santa Chiara College for the smooth handling of the presentations. Our thanks also go to all the speakers for the quality of their contributions and to all the participants for their enthusiasm which greatly contributed to the success of the meeting. This time our social thanks go to the Contrada della Giraffa for its hospitality and for the very pleasant conference dinner. Finally we would like to thank Prof. Pier Giovanni Pelfer, who after initiating this series of meetings and contributing to the organization during all the past editions, has stepped down from the local organizing committee.

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