There are some enterprises in which a careful
disorderliness is the true method.
Herman Melville, Moby Dick

EDITORIAL

Last year the LEP e^+e^- collider at CERN ran for the first time above the W-pair production threshold providing direct confirmation of the mechanisms at work in the Standard Model of elementary particles. So far, the SM, in its simpler version, has encountered an unprecedented and vastly unexpected success. Few, in fact three, families of leptons and quarks interact through few forces, whose behaviour is consistent with unification at very high energy, when not already unified at the energies reached by present particle accelerators. The theoretical foundations of the SM were laid in the mid sixties, when the quark hypothesis was put forward to explain the regularities of the observed particle spectrum, and with the introduction of the spontaneous symmetry breaking mechanism, as a means of reconciling the massless photon with the massive vector bosons needed to mediate the weak interaction. The observation of the quarks-partons in 1968 was followed few years later by that of the weak neutral current, of the fourth quark, and of jets in high-energy collisions. All these experimental observations rapidly decreed the success of the SM. More and more precise tests of the SM have been performed at energies ranging from the atomic scale up to about 2000 GeV. Tests of the behaviour at much higher energies, close to the Planck scale, have been performed in underground laboratories by searching for the instability of the proton. Several machines were built to study in detail specific systems, such as B-hadrons, or the region of electroweak unification. The experimental results so far are almost universally in agreement with a simple version of the SM. Deviations slightly over three sigmas, possibly hinting at new physics, have regularly disappeared with increased statistics or better control over the systematics. Other deviations or unexpected events have not yet been confirmed and could be doomed to a similar fate. Recent exciting news come from the HERA ep collider at DESY: there is some hint of an excess of events at large Q^2, seen by both the H1 and ZEUS collaborations. These findings also need confirmation. On the other hand, some domains, such as CP violation, have not yet been investigated outside the K sector where they were initially discovered, and could lead to surprises with more precise experiments and new theoretical speculations. In addition, the persistent lack of detected solar neutrinos with respect to predicted rates, or the athmospheric neutrino anomaly, could point to neutrino masses and oscillations. Theoretically the SM is far from satisfactory, gravity is hard to imbed, ad hoc cancellations and fine tunings are needed to maintain the predictions without large modifications due to radiative corrections. Extensions of the SM including Supersymmetry, such as the MSSM or the GMSSM, provide possible clues to these puzzles. Central to the present understanding of the SM is the mechanism of spontaneous symmetry breaking, with the search for one or more Higgs bosons. Such searches, like the searches for supersymmetric particles, have so far yielded negative results at energies up to about 170 GeV in e^+e^- collisions and 1800 GeV in $p\bar{p}$ collisions. Hints pointing to one or another SUSY scenario, though exciting and interesting, are not yet sufficient to establish the presence of new physics and phenomena beyond the SM.

These and other themes were discussed during the four-day 5th San Miniato Topical Seminar on 'The Irresistible Rise of the Standard Model', which took place in April 1997 in the Conference Centre "I Cappuccini" of the Cassa di Risparmio di San Miniato, a beatiful old monastery isolated in the Tuscan countryside, renovated and transformed into a meeting centre. The programme of the conference comprised sixty-five talks and posters covering particle physics, cosmic ray and undergound experiments and many aspects of the theory. The meeting was attended by 80 physicists, representing 47 laboratories, and coming from 11 different countries.

The meeting started with a discussion of the construction of the SM by R. Brout, one of the original founders. Detailed discussions followed concerning all the sectors of the SM: QCD, electroweak, heavy-

flavours, neutrino physics. Upgrades of the present machines and the status of future ones were also discussed. Some emphasis was given to a new domain of interest of particle physicists, that of cosmic ray astrophysics, with the presentation of planned experiments on antimatter search and on γ-ray astronomy, and of hot results on γ-ray bursts, in addition to limits on monopoles and other particles. The meeting closed with reports on searches for new particles and new interactions at LEP, at the FNAL Tevatron and at HERA.

The Seminar was sponsored and supported by the Italian Institute for Nuclear Physics (INFN), the Universities of Bologna and Florence, the Regione Toscana, the Cassa di Risparmio di San Miniato and the Electronics and Instrumentation Firm CAEN. We would like to thank the sponsoring institutions who rendered the meeting possible and in particular Prof. L. Maiani, President of the INFN, Prof. A. Forino, Director of the Physics Department of the University of Bologna, Prof. F. Roversi-Monaco, Rector of the University of Bologna, Prof. F. Barocchi, Director of the Physics Department of the University of Florence, Prof. P. Blasi, Rector of the University of Florence, Mr. V. Chiti, President of the Regione Toscana, and Avv. C. Franci, President of the Cassa di Risparmio di San Miniato. We would like to thank most warmly the secretaries of the meeting and all the people who helped us with the organization and during the meeting, Ms. M. Boldini, Ms. S. Cappelli and Mr. S. Zagato. Our thanks go also 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.

F.-L. Navarria
P.G. Pelfer
Editors