Z. Phys. C – Particles and Fields 38, 1 (1988)

Zeitschrift für Physik C Particles and Fields

Preface

This issue of Zeitschrift für Physik C contains the papers which have been presented at the *Sixth International Conference on Ultra-Relativistic Nucleus-Nucleus Collisions, Quark Matter 1987*, held in Nordkirchen from August 24–28, 1987.

The conference was attended by about 250 scientists, representing 75 research institutions around the world – the scientific community engaged in experimental and theoretical studies of high energy nuclear collisions. The central theme of the meeting was the possibility of achieving extreme energy densities in extended systems of strongly interacting matter – with the ultimate aim of creating in the laboratory a deconfined state of matter, a state in which quarks and gluons become the active degrees of freedom. High energy accelerator beams and cosmic radiation projectiles provide the experimental tools for this endeavor; on the theoretical side, it is intimately connected to recent developments in the non-perturbative study of quantum chromodynamics. Phase transitions between hadronic matter and quark-gluon plasma are of basic interest also for our understanding of the dynamics of the early universe; they may be relevant for the behaviour of neutron stars, or even for the structure of certain exotic astrophysical objects, such as Cygnus X.

A very special aspect of this Sixth Quark Matter Conference was the advent of the first experimental results from dedicated accelerator studies. These were conducted during 1986/87 at the AGS of Brookhaven National Laboratory, with beams of ^{16}O and ^{28}Si at 14 GeV/nucleon, and at the CERN SPS, with ^{16}O at 60 and 200 GeV/nucleon. An intense discussion of these data formed the main activity of the meeting. Despite some hints in the right direction, it is still too early to reach any conclusions about actual quark-gluon plasma formation. It did become clear, however, that the experimental techniques are suitable for measuring the relevant observables, and it seems possible to attain in nuclear collisions energy densities sufficient for plasma production.

For the convenience of the reader, we have grouped the written versions of the talks according to their subject matter, and not in the order in which they were presented at Nordkirchen. We are grateful to all contributors for their efforts in providing the manuscripts – in particular to the experimental groups who were left with little time between first data taking and publication. Some of the contributions therefore still retain a certain preliminarity; but perhaps this will convey to the reader some of the excitement felt by the participants as they had their first look at a so far unexplored area of physics.

In closing, we want to thank the members of our International Advisory Committee for their assistance, and the entire organisational staff of the meeting who worked so hard in making *Quark Matter* 1987 a success.

R. Santo, H. Satz, H.J. Specht, R. Stock
(Organizing Committee)