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PROCEEDINGS OF THE INTERNATIONAL SYMPOSIUM ON PHYSICS OF PROTON-ANTIPROTON COLLISION

Tsukuba, March 13-15, 1985

NATIONAL LABORATORY FOR
HIGH ENERGY PHYSICS

PROCEEDINGS OF THE
INTERNATIONAL SYMPOSIUM ON
PHYSICS OF PROTON-ANTIPROTON COLLISION

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Organized by
The University of Tsukuba
KEK, National Laboratory for High Energy Physics

Editors : Y. Shimizu and K. Takikawa

Foreword

These are the proceedings of the International Symposium on physics of Proton-Antiproton Collision which was held at Tsukuba from 13 to 15 March 1985. The first two days of the symposium took place at the University of Tsukuba and on the third day the symposium moved to KEK, National Laboratory for High Energy Physics.

More than 200 physicists participated in the symposium, and shared excitement to hear recent development of $p\bar{p}$ collider physics. The organizing Committee would like to take this opportunity to thank everybody who has made contribution to the symposium in one way or another to make it successful. In particular, we would like to thank the speakers, whose talks were the essential ingredients of the symposium and who took time from their busy schedules to prepare the written contributions.

We gratefully acknowledge the financial support of Japan Society for the Promotion of Science, Foundation for Advancement of International Science, and Inoue Science Foundation that made the symposium possible.

The Organizing Committee

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Wednesday, 13 March 1985

Chairmen: Y. Hara
L.G. Pondrom
H.-G. Moser
T. Kobayashi

OPENING ADDRESS

Etsuyuki MATSUURA
Vice President
The University of Tsukuba

First of all let me welcome you all to the Symposium and to the University. It is my great pleasure to open this International Symposium on Physics of Proton-Antiproton Collision on the University campus.

The University of Tsukuba was founded in 1973 in this Science City on the entirely new concept of "open university". This founding concept has been materialized in various activities of the University, and most specifically reflected in the internationalism in education and research taken place in the University and by the University staff.

In the course of twelve years since its foundation, the University has developed to reach the point that almost ninety percent of the initial plans has been implemented to carry full academic programmes and activities. This enables us, I hope, to make positive contributions to the development of science including research in high energy physics.

From these points it is particularly significant for us to host this important international symposium on physics here on our university campus.

It appears that the environment is also desirable for the meeting. You may have already aware that the Expo '85 will be open here in the Science City in a few days. This Expo is indeed symbolic of the Science City, showing the best of the current research and development in science and technology as well as providing outlook to the future. At the same time this Expo reflects the increasing interests in science and technology in wider sectors of the society. As a physicist myself, I hope that research in physics continues to develop in the University as well as elsewhere in the world.

I hope the meeting will be fruitful and you will have pleasant and enjoyable stay in the University.

Thank you.

Introduction

Kunitaka Kondo
University of Tsukuba

First, I wish to say hello to all participants to the symposium. The organizing committee is particularly thankful to our friends from Europe and America, who are visiting us with a gift of most valuable information on present day particle physics.

As an introduction, let me spend a few words to justify a symposium on $\bar{p}p$ physics at this moment in Japan.

Some of the high energy physicists in this country shared interest in and enthusiasm for $\bar{p}p$ collider experiments since early days when the first proposal of the collider was made by Rubbia, McIntyer and Cline. There have been skepticisms around, however, regarding the feasibility of $\bar{p}p$ colliders and their physics output. The success of the CERN SpS collider and the historical event of W and Z discoveries eliminated these skepticisms.

A series of experimental studies at the CERN SpS collider most definitively verified the standard model of elementary particles. The achievements include discovery of the intermediate bosons in support of the Electroweak Unified Theory, observation of particle jets interpretable in terms of Quantum Chromodynamics. Methodologically, a technique of lepton/jet spectroscopy with extensive use of transverse kinematics proved its eligibility in search for new particles and in the study of lepton/quark interactions. There have been also reports on observations of unconventional phenomena which might open up ways to new physics beyond the standard model.

The achievements that experimentalists made at the CERN SpS collider have stimulated many theoretical interests and speculations. We believe the present symposium helps convey the first-hand experimental information to theorists in this country.

Thanks to US-Japan accords on cooperation in high energy physics, a group of Japanese experimental physicists have had an opportunity to collaborate on experiments with the Collider Detector at Fermilab (CDF). They are anticipating the first $\bar{p}p$ collision at Tevatron in the summer of this year.

The three day symposium is organized as follows. On the first day, we hear reports and reviews on physics of soft collisions, so-called log-s physics, and on new observations of jets and their comparison with QCD predictions. Second day, we will hear about further observations on the production and decay of the intermediate bosons. The afternoon of the second day will be dedicated to presentations on new technical aspects of collider experiments, namely, on upgrade of a CERN detector and present status and prospects of Fermilab $\bar{p}$ source and detectors. The third day is devoted to sessions on possible new physics, including reports on observations of dimuon events, lepton-with-jets events which will lead to the top quark discovery, and a review talk by Dr. Rubbia titled "Beyond the Standard Model?" In the afternoon of the third day, we will hear from theorists on interpretations of new phenomena and the physics justification of future supercolliders. The summary of the symposium will be given by Dr. Bjorken.

I hope this symposium is useful to clarify where we stand now about $\bar{p}p$ physics and to foresee the future of this exciting field.