HIGH ENERGY PHYSICS DEPARTMENTS

(former Department of High Energy Physics)

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OVERVIEW:

Following our long-time tradition we will present under a common header the activities of the seven new units created in 1997 on the basis of the former Department of High Energy Physics:

Department of Particle Theory	(Dept. V)
Department of Leptonic Interactions	(Dept XI)
Department of Hadron Structure	(Dept XII)
Department of High Energy Nuclear Interactions	(Dept XIII)
The ALICE Experiment Laboratory	(NAL)
The ATLAS Experiment Laboratory	(NAT)
High Energy Physics Detector Construction Group	(PBD)

At the end we will list our common activities: lectures and courses as well as seminars.

Our research covers a variety of problems of the experimental and theoretical high energy particle physics: the hadronic and leptonic interactions with nucleons and nuclei (characteristics of particle production, including heavy quark physics), $e^+ e^-$ interactions and tests of the Standard Model (also evaluation of radiative corrections), ultrarelativistic heavy ion interactions and search for the quark-gluon plasma, as well as the spectra, composition and interactions of high energy cosmic ray particles. Research on detectors and accelerator components as well as the development of the apparatus for the high energy physics experiments at future accelerators: LHC (CERN, Geneva), RHIC (Brookhaven), B-Factory (KEK, Tsukuba) and TESLA (DESY, Hamburg) is also carried out. The technology of new materials with unique properties such as carbon-carbon composites is also worked on from the point of view of their application in high energy physics experiments.

The Division is located in a separate building on the campus of the University of Mining and Metallurgy. This location, close to the Jagiellonian University, facilitates the collaboration with the latter and with the University of Mining and Metallurgy. The joint weekly seminars carried out for nearly 40 years prove this long term tradition. A substantial part of our activities is teaching and training students from the academic community in Kraków at M.Sc. and Ph.D. level. Joint research, teaching and academic training in high energy physics are carried out within the M. Mięsowicz Inter-Institute Centre for High Energy Physics, which was formed by an agreement between the University of Mining and Metallurgy, the Jagiellonian University and our Institute to honour the late Prof. Marian Mięsowicz, the founder and the long-time leader of the high energy physics community in Kraków.

Since the modern high energy physics experiments require enormous technical, man-power and financial efforts, our research is mainly carried out in large international collaborations. These are

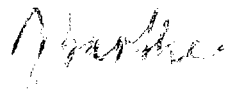
listed at proper places in the following text. They were formed at the leading laboratories where large accelerators have been or will be constructed: the European Laboratory for Particle Physics CERN in Geneva (SPS, LEP, LHC), DESY in Hamburg (HERA, TESLA) Brookhaven National Laboratory (RHIC), Fermilab in Batavia, USA (TEVATRON) and KEK in Tsukuba, Japan (KEK-B). Our Institute also participates in the international Pierre Auger Project aimed at the study of extremely high energy cosmic rays.

Our work in 1999 resulted in the publication of very interesting results from the e^+e^- experiment DELPHI at LEP, the $e^{\pm}p$ experiments H1 and ZEUS at HERA, and on heavy ion collisions from BNL and CERN. Short reviews of some of these can be found in the following pages together with results obtained in other experiments, like e.g., the cosmic ray experiment JACEE, and also with those published by our theorists. Our computing facilities allow the application of the most advanced Monte-Carlo methods both for solving theoretical problems and for modelling the conditions of experiments. A good computer link permits e.g. a nearly on-line control of data quality in running experiments.

Close research contacts in some projects such as the DELPHI, ZEUS, NA49 and LHC experiments are being maintained with the A. Sołtan Institute of Nuclear Studies in Warsaw and the Institute of Experimental Physics of the Warsaw University.

In 1999 our division organized the Cracow Epiphany Conference on Electron-Positron Colliders, two large Collaboration Meetings (DELPHI and ZEUS) and two smaller Workshops (ATLAS Transition Radiation Detectors and NA49).

It should be pointed out that our activity would be practically impossible without the financial support of the State Committee for Scientific Research in Poland, the German-Polish Foundation, the EEC-Network and Mobility Programs, and the generous help of DESY which for several years has been funding most of the per-diem expenses of our staff and students in Hamburg as well as the purchase of the computer equipment. We have also been helped by CERN, IN2P3, KEK, MIT, and the German-Polish Centre for Particle Physics (Bielefeld, DESY-Zeuthen, Dortmund, Karlsruhe, MPI Munich). This support is gratefully acknowledged.



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