

## 6 DEPARTMENT OF HIGH ENERGY PHYSICS



Head of Department: Assoc. Professor Helena Białkowska  
phone: (22) 621-28-04  
e-mail: Lena.Bialkowska@fuw.edu.pl

### Overview

The activities of the Department of High Energy Physics are centered around experiments performed at accelerators in the following laboratories:

- At CERN, the European Laboratory for Particle Physics in Geneva, Switzerland:
  - DELPHI\* at LEP  $e^+e^-$  storage ring - the tests of the Standard Model, b-quark physics, gamma-gamma interactions and search for Higgs boson and supersymmetric particles
  - NA48 - the CP-violation and rare  $K^0$  decays
  - COMPASS (Compact Muon and Proton Apparatus for Structure and Spectroscopy) - studies the gluon polarization in the nucleon
  - NA49\* and WA98\* - heavy ion physics, looking for possible effects of the phase transition to the quark-gluon plasma state
- At CELSIUS Storage Ring in Uppsala, Sweden:
  - WASA - a precise study of near threshold resonance production.
- At RHIC - study of pp elastic scattering.
- At DESY in Hamburg, Germany:
  - ZEUS - deep inelastic scattering of electrons and protons, proton structure functions, diffractive photon-proton interactions.
- Super-Kamiokande and K2K - a study of neutrino oscillations.

The groups from our Department participated in the construction phase of the experiments, both in hardware and in development of the software used in data analysis. Presently they take part in the data collection, detector performance supervision and data analysis.

The Department is also involved in the preparation of new experiments:

- search for optical flashes of cosmic origin: “ $\pi$  of the sky” project - search for optical counterparts of  $\gamma$  ray bursts,
- CMS (Compact Muon Solenoid) at the LHC,
- LHCb (b-quark production and CP-violation) at the LHC (Large Hadron Collider) at CERN,
- ALICE - experiment to study the heavy ion interactions at the LHC,
- ICARUS - tests of a liquid argon TPC, in preparation for neutrino beam (CERN to Gran Sasso), and to be used for cosmic neutrino detection,
- study of charge exchange processes in d-p collisions at Nuclotron in Dubna.

A mechanical workshop attached to our Department participated in the construction of prototypes for the alignment monitoring system for the Outer Tracker detector in the LHCb experiment. Now large scale preparations for the straw tube modules assembling are under way.

Two of our colleagues work on the phenomenology of the quark-gluon plasma formation and of the low energy hadron-hadron reactions.

We collaborate with the Institute of Experimental Physics of the Warsaw University in most of our experiments as well as take part in teaching and supervising diplomas. There is a group of 10 PhD students working in our Department.

\* These experiments finished the data taking activities, but continue to analyse the data assembled.