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7 DEPARTMENT OF COSMIC RAY PHYSICS

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Overview

The Department of Cosmic Ray Physics in Łódź is involved in basic research in the area of high energy physics and cosmic ray physics related to:

- Studies of asymptotic properties of hadronic interactions based on the analysis of cosmic ray propagation in the atmosphere.
- Experimental and phenomenological studies of Extensive Air Showers induced by cosmic ray particles.
- Search for point sources of high energy cosmic rays.
- Studies of cosmic ray propagation in the Galaxy and mechanisms of particle acceleration.
- Studies of mass composition of cosmic rays in the energy range 10^{15} - 10^{17} eV.

Theoretical and experimental studies of Extensive Air Shower properties are performed mostly based on the results obtained by the Łódź Extensive Air Shower Array. We analysed nearly 100,000 events of energies above 10^{15} eV registered by the Łódź hodoscope. We have developed the method of data analysis which allows us to verify different models of cosmic ray mass composition.

In our research in high energy cosmic rays we also used experimental data from other collaborating experiments in Karlsruhe, Baksan and THEMISTOCLE.

The Łódź group collaborates with many foreign institutes and laboratories in construction and data interpretation of cosmic ray experiments. Our most important partners are: Forschungszentrum in Karlsruhe (Germany), Collège de France, Institute for Nuclear Studies of the Russian Academy of Science, University of Perpignan and Uppsala University (Sweden).