

## Abstract

The HERA-B experiment located at the HERA collider at DESY, was designed and built to measure CP violation in the system of neutral B mesons. One of the HERA-B detector components is the Inner Tracker, which consists of Micro-Strip Gas Counters with a Gas-Electron Multiplier (GEM-MSGC).

This thesis describes the development of a pattern recognition algorithm (CATS) for the Inner Tracking system of HERA-B. The algorithm was successfully used during online data taking and offline reprocessing of the collected data in the years 2002 and 2003.

During the running period 2002/03 the performance of the Inner Tracking system was estimated. The applied procedure was based on the developed pattern recognition algorithm. With the help of the measured efficiencies, a tuning of the GEM voltages was performed in order to increase the efficiency of the Inner Tracking system.

The second part of this thesis describes a measurement of the inclusive differential cross sections  $d\sigma_{pA}/dx_F$  and  $d\sigma_{pA}/dp_t^2$  for the production of  $K_S^0$ ,  $\Lambda$  and  $\bar{\Lambda}$  particles produced in pN collisions at  $\sqrt{s}=41.6$  GeV. As target materials C, Ti and W were used and the dependence of the total cross section  $\sigma_{pA}$  on the target atomic mass is measured.