Abstract

For this thesis, minimum bias data taken during December 2002 with the HERA-B detector at the Deutsches Elektronen-Synchrotron (DESY) in Hamburg were analysed. The decays of Λ- and Λ-hyperons which were produced in pA collisions at a centre-of-mass energy of $\sqrt{s} = 41.57$ GeV were analysed, and the polarisation of Λ- and Λ-hyperons was measured for different target materials. A specialised, fast Monte Carlo simulation which increased the number of the Λ- and Λ-hyperons in the Monte Carlo data sample was used for acceptance determination. The measurement of the transversal Λ-polarisation led to the following results:

\[
\begin{align*}
P(\Lambda, \text{Carbon}) &= 0.066 \pm 0.029 \text{(stat.)} \pm 0.010 \text{(syst.)} \\
P(\Lambda, \text{Carbon}) &= 0.015 \pm 0.045 \text{(stat.)} \pm 0.038 \text{(syst.)} \\
P(\Lambda, \text{Tungsten}) &= 0.063 \pm 0.024 \text{(stat.)} \pm 0.014 \text{(syst.)} \\
P(\Lambda, \text{Tungsten}) &= 0.086 \pm 0.037 \text{(stat.)} \pm 0.048 \text{(syst.)} \\
P(\Lambda, \text{Titanium}) &= 0.188 \pm 0.039 \text{(stat.)} \pm 0.015 \text{(syst.)} \\
P(\Lambda, \text{Titanium}) &= 0.131 \pm 0.065 \text{(stat.)} \pm 0.047 \text{(syst.)}
\end{align*}
\]

The measurement yields a non-zero polarisation with a significance of 2 $\sigma$ for the Λ-hyperon, and for the Λ, the polarisation is consistent with zero. These results are in good agreement with earlier measurement and with theoretical expectations.