

Towards Polarized Antiprotons at ANKE/COSY

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Investigation, performed during last five years towards polarized antiprotons was presented. Experiments were performed using ANKE spectrometer at COSY.

In first part we discuss polarizing a proton beam in a storage ring, either by selective removal or by spin flip of the stored ions. Prompted by recent, conflicting calculations, we have carried out a measurement of the spin flip cross section in low-energy electron–proton scattering. The experiment uses the cooling electron beam at COSY as an electron target. The measured cross sections are too small for making spin flip a viable tool in polarizing a stored beam. This invalidates a recent proposal to use co-moving polarized positrons to polarize a stored antiproton beam.

The PAX Collaboration has successfully performed a spin-filtering experiment with protons at the COSY ring. Experiment condition and results were presented in II part. The measurement allowed the determination of the spin-dependent polarizing cross section that compares well with the theoretical prediction from the nucleon–nucleon potential. The test confirms that spin-filtering can be adopted as a method to polarize a stored beam and that the present interpretation of the mechanism in terms of the proton–proton interaction is correct. The outcome of the experiment is of utmost importance in view of the possible application of the method to polarize a beam of stored antiprotons.

Literature:

[1] D.Oellers et al., Physics Letters B674 (2009) p.269

[2] W. Augustiniak et al., Physics Letters B 718 (2012) p.64

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