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Polarizing antiprotons for FAIR - Overview of PAX experiments

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for the PAX collaboration.

A polarized antiproton beam to be used at FAIR would give access to a completely new research field in the study of the strong interaction utilizing polarization technology as a highly selective tool. One of the main objectives is the unique possibility to access model independent and directly the transversity of the proton through Drell-Yan events generated in double polarized proton-antiproton interaction.

In order to reach the goal of the production of a useful polarized antiproton beam, the PAX Collaboration has undertaken the task to design and commission a dedicated experimental facility. This process includes the submission of a proposal to measure the antiproton-proton spin-dependent cross section at the AD ring [1].

To meet the technical challenges of installing the developed facility in the AD ring a proton-proton spin-filter experiment has been done at the Cooler Synchrotron COSY. The experiment successfully proved the validity of the spin-filter method to polarize a stored beam in situ and led to a deepened understanding of the inherent machine properties that need optimizing for the process to be effective [2].

An overview of the achieved milestones and the planned PAX experiments will be given.

[1] Technical Proposal for the Measurement of the Spin-Dependence of the $p\bar{p}$ Interaction at the AD-Ring, PSC-2009-012; SPSC-P-337.

[2] W. Augustyniak et al., Phys. Lett. B 718 (2012) 64.

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