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New aspects of storage-cell developments for the polarized internal target at LHCb

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Like the ANKE experiment at COSY a polarized internal storage-cell target in front of the LHCb detector is the aim of the LHCSpin Projekt at CERN. This target will be an openable T-shaped tube that will be fed with a beam of polarized hydrogen atoms from an atomic beam source (ABS) operating according to the Stern-Gerlach principle. One critical detail of such a storage cell is the surface coating that should minimize polarization losses due to wall collisions and recombination of the atoms into less polarized molecules. Due to the restrictions of the LHC operations a carbon coating seems to be the only option, but this has never been investigated for storage cells.

At the Institut für Kernphysik at Forschungszentrum Jülich, a setup is in use dedicated to study polarization losses in storage cells as a function of surface materials, temperature, magnetic holding fields or recombination processes. Therefore, this setup is a good tool to investigate carbon coated storage cells for further use at LHC.

Additionally, due to a slight modification of the ABS the influence of Lyman- α photons on the recombination process of hydrogen on the surface can be investigated.

In this talk, the setup of the storage cell investigations will be presented and the recombination process of hydrogen on a carbon surface will be discussed. The latter is also of interest for understanding the formation of molecular hydrogen in interstellar clouds.

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