Precision, absolute proton polarization measurements at 200MeV

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A polarimeter for absolute proton beam polarization measurements at 200 MeV with accuracy better than ±0.5% has been developed as a part of the RHIC polarized source upgrade.

The polarimeter is based on elastic proton-carbon scattering at 16.2° where the analyzing power is close to 100% and known with high accuracy. The elastically and inelastically scattered protons are clearly identified by the difference in their propagation through a variable-thickness copper absorber and their energy deposition in the detectors. The 16.2° elastic scattering polarimeter was used for the calibration of a high-rate inclusive 12° polarimeter for on-line polarization tuning and monitoring. This technique can be used for accurate polarization measurements in the energy range between 160 and 250 MeV.

References