

H-JET POLARIMETER AT RHIC

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The experience of the absolute H-jet polarimeter operation at RHIC in 2004-2018 Runs at RHIC will be reviewed. The H-jet polarimeter is a windowless internal polarized atomic hydrogen target inserted into the RHIC ring at the intersection point for measurement of the high-energy circulating proton beam polarization via p-p elastic scattering at low momentum transfer in the Coulomb-Nuclear Interference (CNI) region. The state-of-art designs of the dissociator, the vacuum system and the sextupole separating magnet produced the record atomic beam intensity and tight beam focussing. This resulted in achievement of the H-jet target thickness up to $1.2 \cdot 10^{12}$ atoms/cm². The precision tuning and continuous monitoring of the RF-transitions using the Breit-Rabi atomic beam polarimeter ensures transition efficiencies close to 100%. This provides the highest possible polarization defined only by the holding magnetic field value, which is 98% for the field of a 1.5kG. The polarization value is known with a good accuracy due to measured very small (less than 0.5%) molecular hydrogen contamination. The atomic hydrogen beam is crossing the RHIC vacuum chamber with minimal losses. The small diameter collimators were used due to tight beam focussing to minimize gas load to the RHIC vacuum system and to reduce background due to scattering on residual gas. The upgrade of the silicon detectors and DAQ for the Run-2015 reduced the statistical and systematic errors of the polarization measurements and produced precision measurements of the analyzing power for p-p scattering at 100 GeV and 255 GeV.

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