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The RHIC Polarized H^- Ion Source

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A novel polarization technique had been successfully implemented for the RHIC polarized H^- ion source upgrade to higher intensity and polarization. In this technique a proton beam inside the high magnetic field solenoid is produced by ionization of the atomic hydrogen beam (from external source) in the He-gas ionizer cell. Further proton polarization is produced in the process of polarized electron capture from the optically-pumped Rb vapor. The use of high-brightness primary beams and large cross-sections for charge-exchange resulted in production of high intensity H^- ion beam with 85% polarization. High beam brightness and polarization resulted in 75% polarization at 23 GeV out of the (Alternating Gradient Synchronisation) AGS and 60-65% beam polarization at 100-250 GeV colliding beams in RHIC.

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