

Calibration of Spin Rotators

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For 100 GeV protons with longitudinal polarization the calculated sensitivities to rotator currents are given in the following graph. Each rotator consists of four helical dipoles as described in previous meetings. The angles plotted are relative to the longitudinal direction at the center of either the STAR or PHENIX detector. A 1% error in energy would shift the polarization direction by 0.4° in θ_x . (There is a net spin precession of 40° about the vertical axis after the rotator due to the D0 and DX dipoles.)

The polarization deviation due to steering errors through in IR will be amplified by the factor of $G\gamma = 191.08$; e. g. a 0.5 mrad steering shift would change the polarization direction by about 5.5° . I believe we will want to keep the IR steering angle changes (drifts) down to the 0.1 mrad range at 100 GeV. (At 250 GeV, this effect will be 2.5 times larger.)

