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Helicity Evolution at Small x[1] MATTHEW SIEVERT, Los Alamos National Laboratory, YURI KOVCHEGOV, The Ohio State University, DANIEL PITONYAK, Penn State Berks — We construct small-x evolution equations which can be used to calculate quark and anti-quark helicity TMDs and PDFs, along with the g_1 structure function. These evolution equations resum powers of $\ln^2(1/x)$ in the polarization-dependent evolution along with the powers of $\ln(1/x)$ in the unpolarized evolution which includes saturation effects. The equations are written in an operator form in terms of polarization-dependent Wilson line-like operators. While the equations do not close in general, they become closed and self-contained systems of non-linear equations in the large-N_c and large-$N_c \& N_f$ limits. After solving the large-N_c equations numerically we obtain the following small-x asymptotics for the flavor-singlet g_1 structure function along with quarks hPDFs and helicity TMDs (in absence of saturation effects): $g_1^S(x,Q^2) \sim \Delta q^S(x,Q^2) \sim g_{1L}^S(x,k_T^2) \sim \left(\frac{1}{x}\right)^{\alpha_h} \approx \left(\frac{1}{x}\right)^{2.31\sqrt{\frac{\alpha_s N_c}{2\pi}}}$. We also give an estimate of how much of the proton's spin may be at small x and what impact this has on the so-called "spin crisis."

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