The polarization measurements with hyperons like Lambda in the forward region in pp/pA collisions are of particular interest in several aspects: i) The longitudinal spin transfer, DLL of Lambda and anti-Lambda hyperons may provide new insights into the polarization of strange and anti-strange sea quarks in the nucleon [1-3]; ii) Measurements of the transverse spin transfer of Λ hyperon in pp collisions, for example, DNN, can provide a unique window into the quark transversity distribution in the nucleon[4]; iii) The surprisingly large transverse polarization of hyperons with respect to the production plane in hadron-hadron collisions, which has been observed for 30 years but still not fully understood yet. It is believed that pQCD and collinear factorization should apply at pT about 4 GeV[5, 6].

At STAR, the forward Lambda reconstruction can be realized through charged channel to proton and pion with forward tracking system (FTS) plus the forward calorimeter systems (FCS), which will cover the pseudo-rapidity range of 3<|η|<5. The momentum and charge of pi^- come from FTS, and the energy/momentum for proton read from the calorimeter FTS. The background suppression will heavily rely on the displaced vertex cut and PYTHIA simulation shows that 90% of the background can be removed with a displaced vertex cut of 100 cm while 70% of the Lambda signal can survive. From simulation with PYTHIA, about 60% of the Lambda in this range have a longitudinal momentum fraction x\_F>0.1 for pp collision at 200 GeV, and a integrated luminosity of ~10 pb^-1 would allow a polarization measurement at the precision of 0.01 assuming a sampling and reconstruction efficiency of 10^{-4} and a signal to background ratio about 1:1.

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