Charmed hadron production in polarized pp reactions as a probe of polarized gluons in the proton

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To extract information about behavior of polarized gluons in the proton, we focus on the charmed hadron production at BNL–RHIC experiment. Since the charmed hadron production occurs dominantly via gluon-gluon fusions, its polarized reaction must be effective for testing the polarized gluon in the proton. In this work, as a typical example of such processes, we consider the following processes;
(a) $p + \vec{p} \rightarrow D^* + X$,
(b) $p + \vec{p} \rightarrow \vec{\Lambda}_c^+ + X$.
For those processes (a) and (b), a single–spin asymmetry of an initial proton and a double–spin asymmetry between an initial proton and a produced Λ_c^+, respectively, are quite effective for extracting the polarized gluon distribution in the proton. We calculate the p_T and η distributions of those observables with statistical error estimation. We also calculate the spin–dependent cross sections for those processes.
Finally, we discuss the physical implication of those results.

This work is based on the one developed from analysis of Refs. [1] and [2].

References

[1] K. Ohkuma, K. Sudoh and T. Morii, Phys.Lett. **B491** (2000) 117.
[2] K. Ohkuma, T. Morii and S. Oyama, hep-ph/0201144