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Including spin in the string fragmentation model of Pythia 8

Being motivated mainly by the LHC physics, the currently used Monte Carlo Event Generators (MCEGs) lack of the quark spin degree of freedom in their hadronization models. In the recent years, however, the importance of quark spin related effects in hadronization such as the Collins effect has been brought to light by a vivid theoretical and experimental activity. Remarkably, global analyses of Collins asymmetries in semi-inclusive DIS measured by HERMES, COMPASS and JLAB experiments and the corresponding asymmetries measured in e+e- annihilation to hadrons by Belle, BABAR and BESII experiments, have allowed for the extraction of both the transversity PDF and the Collins fragmentation function, uncovering the importance of spin effects in the nucleon structure and hadronization.
To guide the interpretation of SIDIS and e+e- data as well as to make predictions for experiments at future facilities such as the EIC and the proposed 22 GeV upgrade of the JLAB facility, a MCEG that includes quark spin effects in hadronization is necessary. To achieve this goal, we have started a systematic implementation of spin effects in the hadronization part of the Pythia 8 event generator. The spin effects are enabled for DIS and e+e- annihilation via the external package StringSpinner by using the string+3P0 model of polarized quark fragmentation, a generalization of the Lund Model of string fragmentation.
In this talk we summarize the recent developments on the introduction of spin effects in the Pythia8 string fragmentation routine via the StringSpinner package. The generator is used to evaluate transverse spin effects for the final state mesons as well as lambda hyperons produced in semi-inclusive DIS and e+e- annihilation. The comparison of the simulation results with the available data is presented.

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