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Adding vector meson production to polarized string fragmentation in Pythia

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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, and can not reproduce observed transverse spin effects such as the Collins and the dihadron asymmetries, and longitudinal spin effects such as the jet handedness. To guide the interpretation of SIDIS and $^{+-}$ data as well as to make predictions for experiments at future facilities such as the EIC, a MCEG capable of reproducing 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 for the polarized SIDIS process via the external package StringSpinner, which is publicly available. Spin effects are enabled for pseudoscalar meson production by using the string+$^3P_0$ model of polarized quark fragmentation and parametrizations of the transversity PDFs.

This talk is dedicated to a recent major development of StringSpinner which allows for the introduction of vector meson production and decay in the polarized Pythia 8 string fragmentation. After being validated, the package is used to simulate the Collins and dihadron asymmetries in SIDIS and a comparison with currently available data is shown.

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