

Theory and computation highlights in November, 2020
(*Contribution to the Director's Monthly Report to JSABOD*)
December 12, 2020

Theory Center staff participated in this month's 4th and final EIC Yellow Report workshop, which encapsulates a community-wide effort to identify the parameters for flagship experiments planned for the EIC. A key leadership role was played by Dr. Nobuo Sato, as the theory convener of the working group on Inclusive Reactions. A number of Theory Center students and postdocs contributed with impact studies for various reactions, such as polarized inclusive and parity-violating deep-inelastic scattering, which estimated the potential reduction in uncertainties on the quark and gluon polarization relative to our current knowledge. Other channels, such as leading baryon and hyperon electroproduction showed the potential for constraining the gluon content of pions, and potentially kaons. The final Yellow Report is expected to be published in early 2021.

Lorentz transformation and Lorentz invariance is built into the standard model of particle and nuclear physics. In a recent paper [arXiv:2011.02632], submitted to JHEP, JPAC theorists studied the possibility of constraining Lorentz violating interactions in the quark-sector using Drell-Yan dilepton production including effects from Z-boson exchange. Estimates are placed on dimensionless and CPT-even coefficients for Lorentz violation for all quark flavors using measurements from the Large Hadron Collider. This follows a study of Lorentz violation in DIS and estimations for the EIC.