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Systematics analyses on nucleon isovector observables in 2+1-flavor dynamical domain-wall lattice QCD near physical mass

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Analyses on possible systematics in some isovector nucleon observables in the RBC+UKQCD 2+1-flavor dynamical domain-wall fermion (DWF) lattice-QCD will be presented. The reports will be based mostly on the RBC+UKQCD Iwasaki+DSDR ensemble at pion mass of 170 MeV. The vector charge, axial charge, quark momentum and helicity fractions, and transversity are discussed. No autocorrelation issue is observed in the vector charge and quark momentum and helicity fractions. Blocked Jack-knife analyses expose significant growth of estimated error for the axial charge with increasing block sizes that are similar to or larger than the known autocorrelation time of the gauge-field topological charge. Similar growth is seen in the transversity. These two observables, however, do not seem correlated with the topological charge. Related preliminary results obtained jointly by the RBC and LHP collaborations using a RBC+UKQCD Iwasaki ensemble at physical pion mass may also be discussed if relevant.

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