HAW05-2005-000061

Determination of nuclear parton distribution functions and their uncertainties

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Data of nuclear structure function F_2 and Drell-Yan cross-section ratios are analyzed for obtaining nuclear parton distribution functions, and their uncertainties are estimated by the Hessian method. Valence-quark distributions are determined well by the F_2 data in the large-x region. Their small-x behavior is constrained by baryon-number and charge conservations. Antiquark distributions are determined in the small-x region (x∼0.01) by the F_2 data and in the region x∼0.1 by the Drell-Yan data; however, their nuclear modifications are not obvious in the large-x region. Current data are not enough to determine nuclear gluon distributions because they have large uncertainties in the whole x region. A useful code could be obtained from our web site for calculating nuclear parton distribution functions.