Analysis of parton distribution functions in nuclei

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We made a global analysis of deep inelastic scattering and Drell-Yan data for obtaining optimum parton distributions in nuclei [1,2]. The parton distribution functions are provided at Q^2=1 GeV^2 with a number of parameters, which are determined by a χ^2 analysis of the data. An x-dependent functional form is assumed for the initial distributions. Although valence quark distributions in the medium x region are relatively well determined, it is difficult to fix their small x behavior. It is also difficult to determine the antiquark distributions at medium x and gluon distributions in the whole x region. From the analysis, we propose the parton distribution functions at Q^2=1 GeV^2 for nuclei from deuteron to heavy ones. They are provided by either analytical expressions or computer subroutines for practical usage [3]. Our studies should be important for understanding the physics mechanism of the nuclear modification and also for applications to heavy-ion reactions.

References

[1] M. Hirai, S. Kumano, and M. Miyama, Phys. Rev. **D64** (2001) 034003.
[2] M. Hirai and S. Kumano, research in progress.
[3] Nuclear parton-distribution subroutines could be obtained from the web site: http://hs.phys.saga-u.ac.jp/nuclp.html.