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Towards a Neural Network determination of nuclear parton distribution functions

The QCD factorization theorems allows one to write any hard-scattering cross section involving hadrons in the initial state as a convolution between perturbative matrix elements and non-perturbative parton distributions functions (PDFs), which need to be extracted from experimental data by means of a global QCD analysis. Thanks to recent progress from both experiment and theory, the PDFs of free nucleons are currently well known over a wide kinematic range. However, the situation is rather different for the case of bound nucleons inside heavy nuclei, where a number of effects lead to differences between the nuclear PDFs (nPDFs) and their free nucleon counterparts. Improving our understanding of nPDFs is of crucial importance for the modeling of the initial state in heavy ion collisions. In this talk I will present the progress towards a first determination of nPDFs based on the NNPDF framework, extensively used for the cases of unpolarised and polarised free nucleon PDFs.

Authors: ABDUL KHALEK, Rabah (Nikhef); Dr ROJO, Juan (VU Amsterdam and Nikhef)

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