ID de Contribution: **570** Type: **Parallel session talk**

Quantifying the impact of collider isolated photon data on global PDF fits

jeudi 21 juillet 2011 15:30 (15 minutes)

Isolated prompt photon production in proton-(anti)proton collisions proceeds mostly through quark-gluon Compton scattering [1] and has been proposed since long to directly constrain the gluon distribution in the proton. There exist 25 pT-differential measurements of isolated photon production at collider energies in the range sqrt(s)=0.2-7 TeV which are well reproduced by next-to-leading-order (NLO) perturbative QCD predictions, yet the photon data have not been included in global parton distribution functions (PDF) fits since more than 10 years. We present a quantitative study of the impact of including these data sets into global PDF fits based on the JETPHOX NLO code [2] supplemented with the NNPDF2.1 parton densities [3]. By running over hundreds of PDF replicas and using the NNPDF reweighting technique [4] we quantify the additional constraints that all these data (and coming LHC measurements) will impose on the gluon distribution of the proton.

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[3] R.D. Ball et al. [NNPDF Coll.], Nucl.Phys.B849(2011)296; arXiv:1101.1300
[4] R.D. Ball et al. [NNPDF Coll.], Nucl.Phys.B849(2011)112; arXiv:1012.0836

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Classification de Session: QCD

Classification de thématique: QCD