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Towards small- x phenomenology

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Current (and future) collider energies, as well as high-energy astroparticle interactions in the atmosphere, allow to probe the proton at very small values of the parton momentum fraction x . At small x , both perturbative partonic coefficients and DGLAP splitting functions are affected by a logarithmic growth, which eventually spoils the perturbativity of the α_s expansion. These small- x logarithms can be resummed to all orders in α_s , thanks to techniques developed more than 10 years ago. Today, we resurrected these techniques and developed a numerical code, named HELL, which provides resummed splitting functions and coefficient functions. Within the framework of the NNPDF methodology, the code HELL allows for the determination of new PDFs, reliable at small x , necessary for the description of highly energetic processes involving protons.

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