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# The NNPDF4.0 global analysis and related studies

*Thursday, 7 July 2022 09:15 (15 minutes)*

We discuss recent developments related to the the latest release of the NNPDF family of global analyses of parton distribution functions: NNPDF4.0. This PDF set expands the NNPDF3.1 determination with 44 new datasets, mostly from the LHC. We derive a novel methodology through hyperparameter optimisation, leading to an efficient fitting algorithm built upon stochastic gradient descent. Theoretical improvements in the PDF description include a systematic implementation of positivity constraints and integrability of sum rules. We validate our methodology by means of closure tests and "future tests"(i.e. tests of backward and forward data compatibility), and assess its stability, specifically upon changes of PDF parametrization basis. We compare NNPDF4.0 with its predecessor as well as other recent global fits, and study its phenomenological implications for representative collider observables. We discuss recent results of related studies building upon the open-source NNPDF framework.

## In-person participation

Yes

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