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Electroweak corrections to $gg \to \gamma\gamma$

Since the discovery of the Higgs boson at LHC, particle physics has entered a new precision era in which improving the accuracy of Standard Model predictions is essential for testing the theory and uncovering potential hints of new physics. In this context, diphoton production plays an important role, both as a probe of the Standard Model and as a background for Higgs measurements. As theoretical and experimental precision continue to improve, electroweak effects become increasingly relevant. In this talk, I will present our calculation of the electroweak corrections to diphoton production through gluon fusion, focusing on the contributions arising from the first two quark generations. The two-loop amplitude is computed using a combination of analytic and semi-numerical methods, allowing us to efficiently handle the most challenging parts of the calculation. I will present numerical results relevant for the LHC, where electroweak effects modify the leading-order $gg \to \gamma\gamma$ cross section by a few percent. These results have been implemented in the parton-level Monte Carlo program MCFM, enabling their use in phenomenological studies.

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