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Precise calculation for the Muon Anomalous Magnetic Moment

The anomalous magnetic moment of the muon, $a_\mu = (g - 2)_\mu/2$, is a sensitive probe of the Standard Model of particle physics and a possible window to New Physics.

Presently, the data-driven dispersive predictions for a_μ significantly disagree with the experimental world average. These calculations are based on the optical theorem and make use of the measurements of the hadron production cross sections in electron-positron annihilation at low energies. In this context, the process of pion pair production is the dominant channel.

We present precise predictions for the processes

$e^+e^- \rightarrow \pi^+\pi^-$ and $e^+e^- \rightarrow \pi^+\pi^-\gamma$, that

have been recently implemented in the Parton Shower event generator `\textsc{BabaYaga}` and will be crucial for new measurements and data re-analysis.

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