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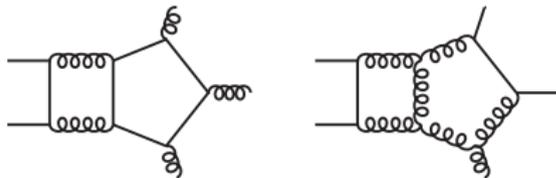
New techniques for higher order collider relevant amplitudes.

- ▶ Numerical Unitarity - amplitude reduction to master integrals.

$$\text{Diagram} = \sum_{\substack{\text{ancestors } \Gamma \\ i \in M_\Gamma \cup S_\Gamma}} \frac{c_{\Gamma,i} m_{\Gamma,i}}{\prod_{\text{props } j} \rho_j}$$

[Abreu, Ita, Febres Cordero, Jaquier, BP, Zeng]

- ▶ Applications: calculation of two-loop 5-point QCD scattering amplitudes.



[Abreu, Ita, Febres Cordero, BP, Sotnikov, Zeng]

- ▶ Unitarity compatible IBPs for differential equations for Feynman integrals.

$$d \left[\text{Diagram} \right] = A_{ij} M_j$$

[Abreu, BP, Zeng]