

## SYNERGIES TOWARDS THE FUTURE STANDARD MODEL

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## Multi-parton contributions to $\bar{B} \rightarrow X_s \gamma$ at NLO

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The calculation of the branching ratio for the inclusive decay  $\bar{B} \rightarrow X_s \gamma$  has been an active field of research for multiple decades, yielding results that work very well as a standard candle of the Standard Model of Particle Physics (SM). In this work, we calculate the remaining pieces for the branching ratio of the four-body decay of a b quark into an s quark, a photon  $\gamma$  and two additional quarks  $q\bar{q}$  at NLO in the strong coupling  $\alpha_s$ . This calculation involves the one-loop process  $b \rightarrow s\gamma q\bar{q}$ , with a virtual gluon, as well as the tree-level contribution to  $b \rightarrow s\gamma q\bar{q}g$ .

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