Short distance and long distance QCD contributions to radiative decays, $B \to X_s + 2\gamma's$ and $B_s \to 2\gamma's$.

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Abstract

The short distance QCD corrections to $b \to s\gamma\gamma$ will be discussed. This leads in particular to a branching ratio of 5×10^{-7} for $B_s \to \gamma\gamma$ and modifies considerably the relative strengths betweem the CP-even and the CP-odd photon amplitudes. For the non-perturbative effects on the energy spectrum on either one of the photons in $B \to X_s\gamma\gamma$, we consider the subprocesses in which a charm quark loop interacts with a self-consistently produced background static QCD field. This magnitude is estimated to be a few percents in $B \to X_s\gamma\gamma$, but can be quite substantial in $B_s \to \gamma\gamma$.