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Determining the photon polarization of the radiative $B \rightarrow K_1(1270) \gamma$ decay

Recently the radiative B decay to the strange axial-vector mesons, $B \rightarrow K_1(1270) \gamma$, was observed. This process is particularly interesting as the subsequent K_1 decay into its three body final state allows us to determine the polarization of the gamma, which is mostly left- (right-) handed for B_{bar} (B) in the SM while various new physics models predict additional right- (left-)handed components. In order to obtain a theoretical prediction for this polarization measurement, it is important to understand the hadronic uncertainties for this decay channel. We first revisit the strong decays of the K_1 mesons, namely the partial wave amplitudes as well as their relative phases, in the framework of the $3P_0$ quark-pair-creation model. Then, we present our result on the sensitivity of the $B \rightarrow K_1(1270) \gamma$ process to the photon polarization.

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