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Near threshold kaon-kaon interactions in the reactions $e^+e^- \to K^+K^-\gamma$ and $e^+e^- \to K^0\bar{K}^0\gamma$

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Collaboration

Abstract content

The strong interactions between pairs of the K^+K^- and $K^0\bar{K}^0$ mesons can be studied in the radiative decays of $\phi(1020)$ mesons. We present a theoretical model of the reactions $e^+e^- \to K^+K^-\gamma$ and $e^+e^- \to K^0\bar{K}^0\gamma$. The K^+K^- and $K^0\bar{K}^0$ effective mass dependence of the differential cross sections is derived. The kaon and photon angular distributions and the branching fractions for the two radiative phi decays are calculated. Numerical results corresponding to different parameterizations of the $K\bar{K}$ interaction amplitudes are given.

The model can be generalized to treat other reactions with two pseudoscalar mesons accompanying photon in the final states formed in the collisions of the e^+e^- beams. A determination of the parameters of the scalar resonances $a_0(980)$ and $f_0(980)$ in the combined experimental analyses of several coupled channel reactions is then possible.

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