Phenomenology 2020 Symposium



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Charm-meson Triangle Singularity in e^+e^- Annihilation into $D^{*0}\bar{D}^0 + \gamma$

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We calculate the cross section for e^+e^- annihilation into $D^{*0}\overline{D}^0 + \gamma$ at center-of-mass energies near the $D^{*0}\overline{D}^{*0}$ threshold under the assumption that X(3872) is a weakly bound charm meson molecule. The Dalitz plot has a \overline{D}^{*0} resonance band in the squared invariant mass t of $\overline{D}^0\gamma$. In the limit as the decay width of the D^{*0} goes to 0, the Dalitz plot also has a narrow band from a charm-meson triangle singularity in the squared invariant mass u of $D^{*0}\overline{D}^0$. At the physical value of the D^{*0} width, the narrow band reduces to a shoulder. Thus the triangle singularity cannot be observed directly as a peak in a differential cross section as a function of u. It may however be observed indirectly as a local minimum in the t distribution for events with u below the triangle singularity. The minimum is produced by the Schmid cancellation between the triangle diagrams and their interference with a tree diagram. The observation of this minimum would support the identification of X(3872) as a weakly bound charm meson molecule.

Summary

Exotic hardons

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