

Phenomenology 2020 Symposium



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Revisiting $X(3872) \rightarrow D^0 \bar{D}^0 \pi^0$ in XEFT

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The calculation of the decay $X(3872) \rightarrow D^0 \bar{D}^0 \pi^0$ in effective field theory is revisited to include final state $\pi^0 D^0$, $\pi^0 \bar{D}^0$ and $D^0 \bar{D}^0$ rescattering diagrams. These introduce significant uncertainty into the prediction for the partial width as a function of the binding energy. The differential distribution in the pion energy is also studied for the first time. The normalization of the distribution is again quite uncertain due to higher order effects but the shape of the distribution is unaffected by higher order corrections. Furthermore the shape of the distribution and the location of the peak are sensitive to the binding energy of $X(3872)$. The shape is strongly impacted by the presence of virtual D^{*0} graphs which highlights the molecular nature of the $X(3872)$.

Measurement of the pion energy distribution in the decay $X(3872) \rightarrow D^0 \bar{D}^0 \pi^0$ can reveal interesting information about the binding nature of the $X(3872)$.

Summary

Exotic States, Heavy Mesons, EFT

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