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Determination of $\omega - \phi$ mixing at leading order

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The $\omega - \phi$ mixing plays an important role in particle interactions involving vector mesons. The SU(3) flavor symmetry predicts the flavor mixing in vector meson nonet. The $\omega - \phi$ mixing angle was predicted by several physical processes, such as decay rate, radiative decay of ω and ϕ . In this work, we calculated vector meson masses by using chiral Lagrangian at leading order (LO) and fitted them to the physical vector meson masses. We adjusted two low energy parameters, m_V and b_D , at the ideal mixing angle. We found that the value of the low energy parameters can recover the $\rho - \omega$ mixing, which is the well-known property of vector meson at LO. Furthermore, when we treated the mixing angle as a free parameter, together with the m_V and b_D , and refitted to the physical masses, we obtained the mixing angle differ from the ideal mixing angle by 2 degrees, and the vector meson masses slightly differ from their physical values.

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