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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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