Study of the Mixing Parameters of $D^0 - \bar{D}^0$ Oscillation in Dirac formalism

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Abstract. In this paper we investigate the mixing parameters of $D^0 - \bar{D}^0$ oscillation in Dirac formalism. In this context for the present study, we assume that the constituent quark –anti quark inside a meson is independent confined by an average potential of the form

$$V_q(r) = V_s(r) + \gamma^0 V_V(r)$$

Where $V_s(r)$ and $V_V(r)$ are scalar and vector components of the potential respectively. Since the present model considers the confining potential to be an equal admixture of scalars and vector components i.e. $V_s(r) = V_V(r) = \frac{1}{2}(a^2 r + V_0)$. We discuss here the mass oscillation of the neutral open charm meson and the integrated oscillation rate using spectroscopic parameters deduced from our earlier study. If CP symmetry is violated, the oscillation rates for meson produced as D^0 and $\bar{D}^0$ can differ, further enriching the phenomenology. The mixing parameters of $D^0 - \bar{D}^0$ oscillation, x_q, y_q and R_M are in very good agreement with BaBar and Belle collaboration results.

Keywords: Mesons, oscillation rates, mixing parameters of $\boldsymbol{D^0 - \bar{D}^0}$ oscillation.

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