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A dynamical link between $D^0 - \bar{D}^0$ mixing and chiral symmetry breaking

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For charm mixing, it is known that the lowest order analysis in the operator product expansion (OPE) does not reproduce the experimental data, indicating the importance of power-suppressed corrections. In particular, contributions induced by quark condensates are discussed as possible sources of enhancement in the previous works. Those investigations generically imply that chiral symmetry breaking plays a crucial role in $D^0 - \bar{D}^0$ mixing.

In this work, we discuss the Dyson-Schwinger approach to charm mixing. By using propagators for d and s quarks, we evaluate SU(3) breaking that originates from dynamical chiral symmetry breaking (DCSB). To this end, we adopt the parametrization of the quark propagator in the previous work, which accommodates color confinement and asymptotic freedom, in addition to DCSB. It is shown that, the order of magnitude for a mixing parameter (x) is comparable to the experimental data, leading to an improvement compared with the OPE analysis.

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