

Pionic transitions to the 1P states of excited charmed mesons in the covariant oscillator quark model

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Since 2010, candidates for the highly excited states of charmed mesons have been successively observed by the BABAR and LHCb collaborations. Although several theoretical studies have been done, spectroscopic assignments for these states still remain to be completely elucidated.

In this work, following our previous work [1], we study extensively the pionic decays of the radial and highly orbital excited charmed mesons by adopting the covariant oscillator quark model. In particular, our special attention is paid to the transitions to the 1P final states that could have a major impact on the total widths. In addition, similarly to the preceding study, we carefully examined the relativistic effect to the calculated widths, not been incorporated into the nonrelativistic models.

Based on the results obtained, we will discuss the possible assignments for newly discovered states, $D(2550)$, $D^*(2600)$, $D(2750)$, $D_1^*(2760)$ and $D_3^*(2760)$. Moreover, predicted widths for experimentally missing states may be helpful for the future searches.

Reference

[1] T. Maeda, K. Yoshida, K. Yamada, S. Ishida, and M. Oda, "Strong decays of excited 1D charmed(-strange) mesons in the covariant oscillator quark model", in Proceedings of the 16th International Conference on Hadron Spectroscopy (HADRON2015), AIP Conference Proceedings 1735, 050012 (2016).

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